SUPPLEMENT

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Section VI.—Ophthalmology.

(Continued.)

STRABISMUS.

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Five years ago I published in The Medical Journal of Australia a paper on the treatment of strabismus. In this I laid emphasis on several principles. One, that early treatment was essential to the best results; another that the ordering of glasses was the beginning and not the end of treatment and the third that in the operative treatment complete tenotomy was not desirable. A considerable further experience has only served to confirm these points.

I intend to confine my remarks to concomitant convergent squint and I make no claim to exhaustive treatment of the subject.

These squints may be divided into the alternate (congenital), the early and the long-standing (neglected); that is, three main classes. The alternate sometimes have no appreciable refractive error, but whether so or not will not recover without operation, as they are due presumably to some imperfect development of the centre for co-ordination. I operate on these patients as early as possible after two years old and very occasionally before they attain that age. The second class consists of patients who are brought with a history of perhaps a week or two, following some acute illness. These children are nearly always hypermetropic and the prescription of an almost full correction will generally prevent squint developing as a permanent deformity. The parents are always told to return at once if any squint is noticed while the child is wearing the glasses and in any case at the end of three months. Sometimes parents wish the tendency to squinting to be permanently removed, so that the child can occasionally go without its glasses. In such cases, if the error is a low one and the fact has been fairly placed before them, that any operation will only be for cosmetic reasons, after the glasses have been worn for a year or so I see no objection to an operation if desired. This is not, however, my routine practice.

The third group is unfortunately the largest, the group in which one eye is amblyopic and (or) the squint, though reduced in degree by glasses, is persistent. This class is becoming and is likely to become still further reduced as the general practitioner as well as the general public realize the importance of early treatment and the idea that the child will "grow out of it" becomes obsolete. Another reason for the number of patients with this form of strabismus is the still prevalent practice even by oculists to consider that when they have prescribed glasses, they have done their duty by their patient and they then lose touch with them.

Here I will say that I do not wish to decry the use of the amblyoscope in training the fusion faculty; but as a practical means I do not rate it highly. It should find its best field in the second group, but here the child is mostly (though not always) too young. I have found it almost impossible to make the child understand what I wish him to see and never feel sure that he is not saying what he thinks I want him to say to save himself trouble. In short, I have not felt justified by results in spending much time on hospital patients in fusion training nor for the same reason in charging fees to private patients that would be in any way commensurate with the time I should have to give. At all events the child is in a much better position for any educative work of this kind when the optic axes have been restored to their normal relations than before.

This brings me to my point which is that operation is the proper treatment for this third group of squints and that nothing is to be gained by delay. The sense of inferiority and deformity in a child's mind must have a blighting and retarding effect. On this ground alone, if on no other, the operation should be done as soon as the child shows no improvement or no likelihood of the eyes becoming straight with glasses.

If the patient has false fixation, I give glasses, occlude the good eye, if practicable, for a month or failing this or in addition use atropine in this eye and continue to do so with at least monthly inspections until vision has ceased to improve and fixation has become re-established. At the end of six months at longest, if the condition is not improving or has become stationary after a certain measure of improvement and the squint is still over ten degrees with glasses, I advise operation. The child cannot grow up with one eye occluded or under cycloplegics. The newly acquired fixation power will soon be lost, since the better eye will instinctively take up the work again. Or, if the eye is not amblyopic, it will soon become so, if it does not get a chance to work with its fellow. It is

far easier to adjust a tendon than to arouse an undeveloped faculty or recover a lost one.

The operation that I favour is Harman's "reefing," combined with a lengthening of the medial rectus by three scissor-cuts: this I call tenoplasty. I will admit that this is one of the most difficult feats in surgery to do accurately and that one is "looking for trouble" when one compares it with a simple tenotomy. But I am equally satisfied that complete tenotomy is not a sound procedure as a routine practice even when associated with a restraining suture. I do the tenoplasty first and then shorten the lateral rectus of the same eye and bandage both eyes for a week. I do advancement at times, but of recent years extremely rarely. I hold the view that adhesions form between the under surface of the advanced tendon and the stump and that in consequence the effect of an advancement is merely to shorten the tendon. This result is attained more quickly, with less trauma, less resultant scar and with more precision by reefing than by advancement. Harman gives two degrees of correction for each millimetre of shortening. I think one gets more when tenoplasty is associated with it, as it always should be. I prefer not to aim at more than about ten millimetres of shortening on the one eye. If more is needed operation can be performed on the other eye. At this point I may say that I always prepare the parents for the probability of a second operation for the fine adjustment. It seldom is needed, but if so the first is not then regarded as a failure. In squints of 30° and upwards I prefer to divide the procedure between the two.

I aim at an immediate slight undercorrection on the table, to allow for consolidation of the scar and slight subsequent contraction. With advancement my impression is that one has to overcorrect at the time; and this is a real bogie. I rarely get an overcorrection, but if I do, I "face the music" within a fortnight or so and readjust the medial rectus by a capsular advancement.

I usually use general anaesthesia, except in older children and adults. But the operation described above is certainly more painful than advancement and tenotomy, as it entails a good deal of pulling and stretching of the tendons: in spite of this, however, I think the advantages outweigh these discomforts.

I regard the result as a good one if the eyes are straight or the convergence with glasses does not exceed five degrees. I much prefer this to the least tendency to divergence. And, if after about a month there is any weakness of convergence when the fixing object is held fifteen centimetres from the eyes, I view the case with suspicion. I seldom get this weakness of convergence after tenoplasty, but if I do I have no hesitation in readvancing the medial rectus. I have operated on fully one hundred and fifty patients by this method with excellent results. I do not think that statistics in cases of this type have much value. I propose for the remainder of the time allotted to me to read a few unselected accounts of cases as I find them recorded for my own use. I shall be only too glad to demonstrate the method of operating to anyone interested who has not seen it done, and to produce a dozen or more patients taken at random from my hospital case-cards to show the final results.

Mr. Edward Ryan said that in suitable cases he did the double operation, that was he performed tenotomy of one muscle and he shortened the other muscle, stretching it to its previous site of insertion. He held the opinion that in a great many persons the squint tended to get well spontaneously. He said that they saw very few squints in adults as compared with children. He did not think that binocular vision was obtained after operation for squint.

Sir James Barrett said that with a colleague he had conducted a lengthy inquiry into the causation of amblyopia and had found that the majority of cases was due to the suppression of vision before the age of seven years together with a congenital failure of the fusion faculty. The fact that in cured squint binocular vision was rarely obtained, indicated the cause of squint. Why should binocular vision not be restored after the cure of the squint if the fusion faculty were not absent? He had found great benefit from occluding the sound eye and forcing the use of the squinting eye, but this must be done before the child was seven years of age. He had seen good results from tenotomy and only one patient with some little deformity due to sinking of the caruncle.

Dr. J. Lockhart Gibson said that he did not think that the treatment of squint was simple or that they knew all about it. He did not believe that amblyopia was ever congenital if the eye were healthy and the fundus perfect. He believed that amblyopia was caused by the cortex being unconsciously told by the patient to disregard images from the squinting retina, because recognition of such images would prove a nuisance. As they did not expect binocular vision, there was no hurry to operate. Very occasionally he had obtained binocular vision. The patient had to do the fusion of the images for himself. He often performed tenotomy, more frequently than advancement operations. He considered that there was sound argument in Dr. Ryan's practice of shortening the muscle and stitching it to its insertion. He would not operate on an eye with refraction squint until after some months of complete correction. He always told the parents that the squint remained corrected with correcting glasses. He did not want the squint to be corrected without the correcting glasses.

Dr. D. D. Paton said that he agreed with the previous speakers that the question of vision was of the first importance and the appearance of second importance. Much of the amblyopia arose from a psychological suppression, but a certain proportion was, he was sure, due to some congenital defect. Possibly the use of the red-free light might throw some light on the subject, if it showed a difference between the two maculae. A girl, aged about fifteen years in whom a convergent strabismus developed, complained before the total suppression of an intermittent scotoma, which, he believed, was an intermittent psychological suppression intermediate to the total suppression. He would be surprised if the same stage occurred in children. He further believed that the determination of the squinting eye might depend to a large extent on a habit of using constantly one eye for alignment instead of the unconscious habit of the coarse adjustment of ordinary binocular vision.

In dealing with treatment he said that stereoscopic vision was an uncommon result of operation. In this connexion he found that operative treatment contrasted unfavourably with orthoptic treatment. In operative treatment he did not agree that a complete tenotomy should not be performed at all, because in a certain class of case there was no movement outward beyond the

middle line. If there was movement of one-third outwards a Bishop Harman's tendon lengthening operation was sufficient. His experience had led him to assert that no one was entitled to diagnose a congenital paresis as a cause of squint until a tenotomy had been carried out, because an eye apparently the subject of a so-called congenital paresis often received immediate full movement on section of the muscle. He looked on the lack of movement in the opposing muscle as a functional inhibition and the amount of divergence as of greater value in determining the operation to be done than the amount of convergence.

Dr. W. Wallis Hoare congratulated Dr. Temple Smith on his paper. He had had the opportunity of seeing several of Dr. Smith's results which were excellent. Harman's operation, in his opinion, while good, was no better than others which were more in general use. He recognized that there was necessity for early operation, notwithstanding the fact that occasionally they discovered during the correction of a refraction error that one eye of the patient was incapable of standard vision; on inquiry the fact was elicited that this eye had had a cast when the patient was young. All operations for squint undertaken under general anæsthesia involved guess work. This was not so when local anæsthesia was used. The oldest patient on whom he had operated had been a widowed lady, aged fifty-one years, who wished to marry again. He was of opinion that it was advisable to keep patients under prolonged observation after operations for squint.

A CONTRIBUTION TO THE STUDY OF "LAMELLAR" CATARACT.

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I wish to bring before you the pedigree of a family in which there are many cases of perinuclear or lamellar cataract. This family is of especial interest as it is a branch of an extensive family investigated by Edward Nettleship, notes of which were published fifteen years ago.

The combined pedigree is shown in Figure I. (see Pages 372-373). In it are four hundred and thirty-three persons, one hundred and eighty-three males, one hundred and eighty-four females and about sixty-five whose sex is unrecorded. Of this total two hundred and five have been examined and reliable information has been obtained of twenty-two. There are sixty-three persons with cataract of whom thirty are males and thirty-three are females. In sixteen persons transmission was through the male parent and of the affected offsprings 51% were the same sex. In eight persons transmission was through the female and 59% of the affected children were female. There are one hundred and eighty-seven children of affected parents and of one hundred and twelve who have been examined or of whom reliable information has been obtained, sixty-four or 57.2% have cataract. Consanguinity by the marriage of first cousins has occurred twice and of the seven children examined three had cataract and two others *retinitis pigmentosa*. Seventy-nine of the Australian branch have been examined by me and of nine I have information that I think is reliable. The youngest patient with a cataract was only three and a half days old when I saw her and the eldest was eighty-two years. The cataract appeared to be practically non-progressive.

Diameter of Opaque Zone and its Relation to Time of Origin.

A year prior to publishing the English family Nettleship described the well known Coppock family in which there were sixteen cases of Doyne's discoid cataract. It was the finding in the pedigree before you of a few cases of discoid cataract together with many typical lamellar cataracts that suggested to Nettleship that the former were but incomplete lamellar cataracts. Only the posterior layer was present, the remainder being absent or so fine as to be invisible in ordinary illumination. In the combined families there are five true discoid cataracts, all except one being in the English branch. There are six (or seven) atypical forms chiefly of the annular type and of these four are in the English and two (or three) in the Australian branch. There are fourteen members showing a typical sub-triangular form of lamellar cataract and twenty-four with typical lamellar cataract.

There is, I think, a definite relation between the diameter of the opacity and the time of its development. If we remember the lamellar structure of the lens and the fact that those epithelial cells which are lengthening into fibres, are the most susceptible to injury, it is easy to imagine how a period of general body malnutrition may lead to a series of defective fibres and consequent opacity. With the passage of time and the developement of new transparent fibres, the cortex surrounding the opacity becomes thicker and this opaque zone gradually sinks towards the lens centre. Other epithelial structures show the effects of malnutrition, but in these, as in the nail, the defective area in time disappears. In the lens because of the low degree of metabolic change and its lamellar structure, there is little tendency for the opacity to be absorbed and the defect is stored up. As the lens transparency depends on the evenness of and low absorptive power of the lamellar fibres, the slightest irregularity is detected as an opacity. Influences which make for lens tissue destruction, acting in the early weeks of intra-uterine life may lead to congenital aphakia or to defective capsular formation and changes in the earliest forming axial antero-posterior fibres may lead to either a congenital central cataract or a fusiform defect. Those influences acting later will produce changes in the neighbourhood of the primitive and Y-shaped suture of the embryonal lens nucleus. Vogt's researches have revealed in 25% of all eyes examined by the slit lamp a congenital non-progressive nuclear cataract which he terms the anterior axial embryonal cataract. In notes kept of lenses examined during the last two years I find I have recorded cases which belong to this group. Lamellar cataract may be produced, and has been produced experimentally, when dystrophic influences affect the lens at a later stage of ante-natal life. Now there is in the family I am reporting a form of cataract which probably is of earlier origin than ordinary lamellar cataract. It appears as a ring within the nuclear area, the largest of the five instances found was about three millimetres in diameter and all appear least dense in the inferior nasal quadrant. This

form of opacity has been classed as atypical discoid. In this family the next largest type is an atypical form of lamellar cataract. Instead of presenting the usual circular shape, it is sub-triangular. The rounded apices present a knob-like opacity which accentuates the triangular shape. External to each knob is found a clear space suggesting that the densely opaque knob has shrunken away from the layer peripheral to it. The knobs take the place of the riders so characteristic of lamellar cataract. Both the knob-like appearances and the riders are probably due to the opaque process spreading along the suture lines or the fibre endings along these lines in advance of the lamellar opacity. In support of this view is the following case.

The left lens of a woman, aged thirty-nine years, showed posterior cortical changes and was needled. Two weeks after the second needling the central two-thirds of the lens was opaque and extensive riders could be traced over the opacity extending into the clear periphery. These corresponded in arrangement to the complex suture figure of that age. In some cases the anterior surface of some cataracts of this group showed centrally the primitive suture line as a faint Y. Nettleship described one member of the family in whom only the posterior half of the sub-triangular opacity was present and so grouped it as an example of atypical discoid cataract.

The remaining cases of cataract were more or less typically lamellar in type. The influence of the suture figure on these was made manifest by a faint central Y-shaped marking and in several the lamella was six or eight sided in shape according to the complexity of the suture branching in the zone containing the opaque lamella. A number of the lamellar cataracts seen showed two, three or even more concentric opaque lamellæ and all showed the presence of riders. The area of lamellar opacity lying immediately under some of the riders was clear and transparent. This appearance was first noted by Marcus Gunn in 1895. The apparent diameter of the lamellar zones varied from 3.5 mm. to 6.5 mm. Apart from these there were frequently observed faint concentric lines sometimes incomplete far out towards the equator. This appearance and the clear splits or fissures subjacent to the riders are most probably due to the shrinking of the most opaque and most central area. The opaque process having spread most rapidly along the suture lines is left as a rider when the radial fissure occurs. Some of the concentric fissures are so faint as to appear merely as lines of altered refractive index rather than opacities and may be due to fluid separating the fibres. Some of the fissures lie so far peripherally and in areas formed so many years after the central areas containing the opaque lamella that it is hardly probable that the same causes are operative in the two conditions. The fact that the majority of lenses with lamellar cataract are more flattened antero-posteriorly than normally, also suggests the occurrence of shrinkage. It seems therefore of chief importance to know the diameter of the primary central lamella in trying to estimate its time of onset and the age at which the causative influences were effective. Sometimes one observes lamellar changes which have arisen during life in the periphery of senile lenses. Therefore it appears wise to refer to the usual form of lamellar cataract as embryonal or infantile according to whether its origin was before or after birth, or as nuclear or perinuclear according to whether it appeared within or without the embryonic nucleus. Then one can class the cases occurring later as adolescent or senile or as peripheral lamellar cataracts. The important fact is the site of the lamellar change rather than its lamellar appearance which is a consequence of the lens structure. As Vogt says: "An opacification situated outside the embryonic nuclear zone cannot be of congenital origin or one situated outside the senile nuclear zone could not have originated in infancy." There has been much discussion regarding the time of origin of the usual form of lamellar cataract. Many have been observed fully formed during the first few weeks of life and four observers have proved the post-natal developement of cataract.

The majority of riders when examined obliquely in a good light appear more extensive in the equatorial area than axially. This and the fact that lens fibres have greatest radial depth equatorially is associated with the antero-posterior flattening of the lens and this flattening is made possible by the gradual increase in the complexity of the suture system.

Aetiology of Lamellar Cataract in the Light of Associated Conditions.

In studying the ordinary sporadic cases of lamellar cataract many observers have been struck by the frequent occurrence of certain associated conditions. The majority of the larger forms of lamellar cataract occur in patients whose permanent teeth show hypoplasia of the enamel. The teeth usually involved being the incisors, biscuspids and first molars. The enamel organs of these are formed between the fourth month and the end of pregnancy. The smaller cataracts show no such associations because the dystrophic influences, which cause the lens opacity, are active before the developement of the enamel organ of the permanent teeth has reached such a stage that it is likely to be affected, *id est* before birth. Collins emphasizes the fact that histological examination of sections of lenses and teeth show that the transition from normal to defective tissue in either structure is gradual, while the later transition from defective to normal tissue is sudden. The deduction from this is that the onset was gradual and the remission of shorter duration.

It is interesting that a third organ of epiblastic origin is often affected. The frequency of convulsions in children with lamellar cataract has been noted by many. They occur during the first few months of life and are often accompanied by carpo-pedal spasms and *laryngismus stridulus* and Collins describes them as "infantile tetany." Peters considers that the ciliary muscle takes part in the convulsive seizure, this leading to interference with the vascular supply of the ciliary processes, an altered nutritive supply and a consequent lens defect. There is little evidence for this view. Collins summarizes our knowledge on this subject as follows:

> Tetany is due to parathyroid deficiency. Cataract often occurs in association with tetany in adults and has been produced by removal of the parathyroids. The convulsions which occur in infancy are probably due to infantile tetany. It would therefore seem likely that the lens changes in such cases are the result of para-thyroid deficiency. Again it is known

that the para-thyroids in some way regulate the calcium metabolism of the body. Removal of the parathyroids reduces the calcium content of the brain to half and also the blood content. Calcium administration can keep off the tetanic convulsions following removal of the parathyroids. Hypoplasia of the teeth is due to defective calcification; in infantile tetany there is deficiency of calcium in the blood and in rickets with which lamellar cataract is occasionally associated, the calcium salts are deficient in the bones. Calcium is a normal constituent of the ash of the lens and may be essential for its developement during the period when it is approaching maturity. Its absence may lead to the defect known as lamellar cataract.

The smaller cases of lamellar cataract which are not associated with any of these conditions are no doubt of earlier origin and may be due to some defective intrauterine condition. Lamellar cataract has been produced in rabbits by feeding the pregnant mother during the second and third week of pregnancy.

None of the above mentioned conditions occur in members of the family here described. The cataract is due to some germinal cause, for it may be transmitted by the male parent. It seems only reasonable to assume, however, that the causes of the change in the germinal cells generations ago were similar to those that can produce the sporadic cases of lamellar cataract only intensified by being more prolonged and by recurrent consanguinity. This was sufficient to fix the lens change as a type to be transmitted. Possibly by the processes of time the associated defects which were no doubt developed at the same time, were eliminated. The primitive lens, however, retains the type once fixed. And as the visual defect is often insufficient in certain cases to prevent the marriage of the affected, the self-eliminating influence applicable to more serious lesions is not effective.

In the family described the chief associated condition is *retinitis pigmentosa*. All these cases were in the English branch of the family. There were fifteen cases and as is so common, more males were affected than females, the proportion being four to one. The combination of these two familial diseases further supports the view that there were probably prolonged periods of poverty, malnutrition and disease and occurrence of consanguineous marriages as causative factors. Anyone knowing isolated conservative Cornish villages, such as the one in which this family has lived for at least six generations, will realize the frequency and ill effects of repeated consanguinity. The descent was with one exception discontinuous, in contrast with the cataract transmission which was rarely discontinuous twice in the Cornish branch and once in the Australian branch. And there is always the possibility that fine though thoroughly typical lens changes may be missed in the sclerosed nucleus of an adult. Nettleship has demonstrated, however, that in the largest pedigrees of *retinitis pigmentosa* descent is without exception continuous and that the frequency of discontinuity is more apparent than real. He has shown that either nerve deafness of a progressive type or feeble mindedness may act as substitutes in the inheritance of *retinitis pigmentosa* and so give continuity of descent. In these three affections there is some weakness of neuro-epithelium with possibly a vascular basis and for the full developement of each defect a certain exciting cause is essential. This may lead to either *retinitis pigmentosa* or deafness or idiocy. The occurrence of deafness in one branch of the Australian family may be the equivalent of *retinitis pigmentosa* the latter being latent in the absence of the necessary exciting cause. So far I have not had the opportunity of examining those affected. There are seven in three families. It commences during adolescence and appears slowly progressive.

Treatment.

Vision in some of those affected has been improved by correcting refractive errors. These errors have been much higher than those in a similar series of individuals without cataract. Some show a high degree of myopia. One whose right lens was extracted at the age of fifty could read 6/24 after extraction without the aid of lenses and was only slightly improved with a small convex cylinder. There was extensive myopic degeneration of the central area of the fundus. However, the improved vision is enabling him at the age of fifty to learn how to plough for the first time in his life. When one observes a patient such as he straining to read ordinary print, one wonders whether this constant straining at near work when the patient is learning to read and his eye tissues are soft and plastic, may not play some part in the developement of an already somewhat myopic eye. Some of the worse affected members of the family can read only if the paper is folded up into a sheet two or three inches square. The increased reflection from a large surface of paper leads to a contracted pupil and so inability to see round the central lens opacity. Others have learned to read between two fingers of a hand placed on the page being read. The majority hold the book well to one side, as if to see round the cataract. They usually look sideways if they wish to see clearly. This and the dislike of bright light are the two most characteristic symptoms. Even though the cataractous process is practically non-progressive, one wonders whether the possibility of all this strain at close work in a young patient with slightly myopic eyes might not justify operative interference when the visual defect itself is insufficient justification. Apart from this no doubt there is an inherited myopic tendency in certain of the families. The value of an optical iridectomy where the opacity is dense and central must be considered with some for the smaller pupil characteristic of middle life will increase their handicap.

In considering treatment from the preventive standpoint it must be remembered that the cause is germinal. Well guarded though the germinal cells are from external harmful influences, their protection from the effects of therapeutic measures appears even greater. But if dystrophic influences can induce an inborn variation of this type by acting on the germinal cells at a certain stage of their existence, it is hoped that possibly some alteration in calcium metabolism or some controlling endocrine secretion, such as the parathyreoid, or some other therapeutic measure may if introduced at the correct time in the cell growth be potent as a cure.

Advice against consanguinity is hardly necessary for mothers who turn each successive newly born baby to the light to see if its eyes are also tainted, are not likely to let their children grow up in ignorance of the (perhaps

over-estimated) evils of interbreeding. So at present there is little one can do.

Just as there is in those hidden germinal cells a storing up of influences which in the future will be so great in effect, so there is in the lens a storing up of the effects of a multitude of influences which have been active throughout its entire developement. We may consider the lens as a crystalline sphere which has stored up in its transparent fibres or opacities of varying form the effects of the previous years in the order of their occurrence because of the lamellar lens structure. In a like manner the rings of a tree tell by the denseness or openness of its tissue the years that were drought or those that were beneficial to its growth.

Dr. J. Lockhart Gibson suggested that the recent knowledge regarding the light factor and its effect on rickets might give the most important explanation of the causes of lamellar cataract. It would also explain the fact that the lamellar cataract occurred in intra-uterine life. It was the ultra-violet rays that exerted an antorhachitic action; they did not come through glass. They did not penetrate far through the skin. Professor C. J. Martin had been chiefly responsible for this knowledge of the action of light.

Section VII.—Otology.

RARE OTOLOGICAL CONDITIONS.

By T. S. Kirkland, M.D. (Glasgow), F.R.C.S. (Edinburgh),
President of the Section; Honorary Consulting Aural Surgeon, Sydney Hospital.

My first duty is to welcome you on behalf of the Congress to this its first meeting and to express the hope that we may all return to our practices with increased knowledge and fresh enthusiasm.

It has been customary for the president of a section to give an address. The Executive in their wisdom have at this Congress made it optional. Addresses take a long time to prepare and a short time to deliver. They generally refer with pardonable pride to the men who have been responsible for the advances which are the patrimony of the present-day practitioner. Some take the form of reviewing ancient history. Researches of this kind generally end in grateful acknowledgement of our predecessors. When I was asked to take the position of President I was assailed by feelings of a very mixed character, chief of which was the fear that I would be unable to present material worthy of your consideration or conduct the deliberations in such a way as to meet with your approval. I was reminded of a story of two actors who were witnesses of a criminal execution. One asked the other how he would like to be in the position of the victim, to which he replied that he would have the satisfaction of having played a leading part for once in his lifetime. Naturally I am proud of the position, but I am beset with fears lest my efforts fall short of your anticipations. It would not be so were I like the ex-Kaiser, fired with commanding egoism, of whom it is said that he would like to be the babe at the christening, the bridegroom at the wedding and the corpse at the funeral.

It may not be out of place to say something about specialism. The retrospect of thirty years of specialism makes me envy the advantages you, who have recently taken up this branch of practice, have over those in the early days. Twenty years ago operations were conducted with less scientific accuracy and our methods were less effective. Take the nose for example. Quite a number of operations were performed for obstruction with but poor results to the patient. That, happily, is not the case at the present day. With the advent of Kilian's sub-mucous resection we have now a reliable method of giving the patient relief. The Gleeson, Asche, Watson and Price Brown operations have since become almost obsolete. Hajek not later than 1910 said to the late Dr. Jay, of Adelaide, that the best nasal surgeon was the man who did not operate at all. Thomas Butlin many years ago, in writing to the Secretary of the Laryngological Association excusing his absence on one occasion when nasal diseases came on for discussion, said that he was so profoundly disgusted with his results that he oftimes wished he had never seen the patient. A great deal of ingenuity was displayed in devising operations for the relief of nasal obstruction, none of which were very satisfactory. You were forced to adopt one of the many operations then in vogue, the Asche, Gleeson, Watson or Price Brown, but in no case could you be quite sure of adding to the patients' comfort. Jones's spokeshave in some cases or the chisel were perhaps the best. The Asche was imperfect, due to the great resiliency of the quadrilateral cartilage. These operations have all become obsolete. Since the advent of the Kilian sub-mucous resection I suppose specialists hardly ever think of operating by any method other than this one.

Suppuration of the antrum was treated by puncture of the alveolus and the insertion of a tube with subsequent syringing which often lasted for years. Now we can emphatically say that an antrum can be cured within two or three weeks. We did not realize at that period that reinfection took place through its connection with the mouth. Polypi were also treated without a complete knowledge of the causative and underlying factors. Radiology lent no aid in doubtful cases of sinus disease.

Dr. Frederick Roberts, President of the British Medical Association in 1903, said in his presidential address that an address should be in the nature of a subject having some general interest and not savour of the absurd irrational and mischievous specialism which is so rampant at the present day. This is the statement of a man who saw only one side of the shield and fancying he had seen both, fell foul of the truth.

No one can deny that specialism has justified its title and I think we all appreciate how much the world is indebted for the advances made due to its aid. What was irrational then, is now every day logic; what was mischievous, has now become wholesome. The province of oto-rhino-laryngology has now come into its own and is recognized as one of the chief branches of specialism.

Before leaving the subject of specialism, we must deplore the fact that as yet the portals of entrance are too wide. I think it cannot be controverted that a man be-

ginning specialism should have some supplementary training to his medical course to fit him for the work. The public have no protection against any man styling himself a specialist. In Holland two years of special study followed by a stringent examination are required before a man can go forth with the hallmark of his profession. I regard general practice for a few years as a necessity. This widens the horizon and saves him from the impeachment which I have often heard levelled at the specialist knowing such a limited field of the human body. He is then in a position to recognize diseases which do not belong to his speciality, for which we are not infrequently consulted. In ophthalmic practice Oxford grants the diploma of ophthalmology. It would not be inadvisable to agitate for the granting by the Universities of a qualification of similar nature, for ear, nose and throat.

I will not delay too long in my introduction. There is:

So much to do that is not even begun,
So much to hope for that we cannot see,
So much to win, so many things to be.

I now propose, having finished my introduction, to present to you the histories in a short succinct manner of a few rare diseases I have met in my practice.

Sarcoma of the Soft Palate.

More than twenty years ago a gentleman consulted me with a pedunculated growth springing from the posterior surface of the soft palate. It was quite single, round and uncapsuled. Some time after its removal a series of growths ranging from the size of a walnut to a bean appeared upon the pharyngeal wall, extending down as far as the hypopharynx. Owing to an exceedingly small mouth I was forced to split the cheek for the purpose of obtaining sufficient room. Dr. Brady assisted at the operation. I was relieved to find on splitting the mucus membrane that they shelled out in capsule. The pathologist who reported on the microscopic appearances described them as definitely sarcomatous.

At that time I could find no record in any of the text books of cases of a similar nature. That they were not malignant was proved by the patient surviving for twenty years. Some time after there appeared a complete account of similar cases collected from the various journals. The growths were then described as adenomata.

Adenoma consists of a simple hyperplasia of gland structure having its type in tubular or acinous glands. The racemose glands of the mucus membrane which are of the mucous type, are very numerous in the nasopharynx and in the soft palate where they form a thick continuous layer. They are also very numerous about the aryteno-epiglottic folds and on the back of the arytenoid muscles in the laryngeal portion of the pharynx. Lymphoid tissue is scattered all over the pharyngeal wall and in some places is collected into lymphoid follicles. Adenomata occur in the intestines. This patient died from intestinal obstruction, but as no *post mortem* examination was made, I am not in a position to say whether he had a recurrence in this situation.

Myxoedema with Laryngeal Signs.

In the year 1909 I was faced with the diagnosis of a case I had never seen before. The patient consulted me on account of a masculine husky voice. The larynx presented no alteration which a casual and hurried examination would reveal. The cords were normal in colour, but slightly broader than usual. The larynx suggested a smaller capacity than normal; the epiglottis was pale; the soft palate anæmic. On interrogation I was informed that the hands and feet were larger than formerly as disclosed to the patient by the increased sizes needed in shoes and gloves. For some time previously she was treated for pernicious anæmia. The case was clearly one of myxœdema and the exhibition of thyreoid gland was successful in bringing back her voice to normal.

I mentioned this case to some of the leading men in Vienna and was told that they had never seen a case involving the larynx. I was under the impression at that time that my observation was original. You will find it, however, mentioned casually in Osler. In self defence I must quote Pope who says that observations which we ourselves do make, become more partial for the observer's sake. I thought I had discovered a fragment of truth which Typhon and his conspirators had torn from the body of Osiris.

Gonorrhoeal Arthritis Affecting the Larynx.

Some years ago a patient in the Sydney Hospital was referred to me by Dr. Frederick Hall. She complained of pain in the larynx, hoarseness and general discomfort. There was present a red angry swelling of the false cord and arytenoid limited to the right side. The case was evidently inflammatory limited and unilateral. It was not specific and certainly not tuberculous. An examination of the vagina disclosed the presence of the gonococcus. It was therefore an arthritis due to this organism.

Angio-Papilloma of the Trachea.

My next case is also a rare one and may seldom come within one's own experience. A robust gentleman of fifty-five years, a tolerably free liver, was subject to hæmoptysis for nine months, sometimes very profuse. His medical attendants were under the impression that he was suffering from cirrhosis of the liver. My firse examination was marred by a copious discharge of blood. These attacks were very frequent. On his second visit I examined by the aid of the bronchoscope and discovered a number of small growths in the trachea which bleed freely on touching. They were removed by the snare through the bronchoscope. Superficially they were studded with blood vessels which one could easily see with the naked eye. The pathologist reported them to be angio-papillomata with a tendency to malignancy. It is now over two years since the operation and I am glad to say the patient is quite well.

Cases of bilocular antrum are sufficiently rare to warrant my giving you an account of a case I had recently. It differs from any case I have previously met in the way of its dichotomy. The partition did not merely divide the antrum into an anterior and posterior portion, but its dividing wall ran round the outer wall of the cavity separated only by three millimetres from the outer wall. It continued in this direction till it reached close to the position of the last molar and then passed straight across. Both cavities contained pus and polypi.

I am of opinion that the discovery was due to having performed Denker's operation which allows a much wider inspection. This operation is preferable to the Caldwell-Luc which gives you a much more limited view. I would advise thinking of the possibility of such a complication in any case which fails to heal. I have recited this case for another reason. It showed me how easily the ethmoid can be reached through the natural ostium of the antrum.

I prefer it to the nasal route. I was much struck by a review of Coakley's books on diseases of the throat and nose in which the reviewer congratulated the author on leaving out a description of the Caldwell-Luc operation. At the present time English surgeons advocate the nasal route almost to the exclusion of all others, but I fail to see how an antrum filled with polypi is going to recover by mere drainage through the nose. No doubt acute, subacute and dental infections may recover in this way, as they will frequently by syringing.

Pemphigus Foliaceus.

There is a disease which may come within the province of the laryngologist and owing to its rareness and the fact that it is described mainly in text books dealing with diseases of the skin, its diagnosis becomes difficult.

I was consulted two years ago by a young robust looking lady for ulceration of the mouth. Her medical attendant had treated her for three months without success. He then referred her to me and stated that the case looked like ulcerative stomatitis. The symptoms certainly were more like this disease than any other I could think of. There were no vesicles nor bullæ present. The ulceration involved the tongue, gums and epiglottis. I found on examining her skin that she had a small dried scab over the umbilicus and a similar one on the armpit. She had herself discovered similar patches on the vagina to those on the mouth. I was puzzled with the case. Subsequently, however, she developed bullæ on the skin, when the disease was recognized by Dr. McMurray as pemphigus. In spite of treatment she succumbed. It appears that the ulceration involves the intestines also. Sinclair Thompson mentions the disease casually in his book and speaks of the prognosis being favourable. This can, however, be so only in cases styled *pemphigus vulgaris,* whereas this case was a severer type and goes by the name of *pemphigus foliaceus.*

The differential diagnosis presented unusual difficulties in the case, as no bullæ were present on the skin, although the disease had existed for three months at the time she came under my care. One small dried crust could be seen in the axilla. With this exception the skin was free from pathological change.

I bring this case before you for the purpose of drawing your attention to a condition which is not described in the text books of our speciality. If I were to venture upon an opinion as to the cause I would say this is essentially a septic disease beginning in the mucus membranes and subsequently involving the skin. It is intractable. Dühring and Hibra recommend that the patient should be kept constantly in a warm bath. It seems, however, that no remedies can produce amelioration.

Tumours of the Carotid Body.

Tumours of the carotid body are rarely described in the text books. That being so, they are not generally known. The only text books in which I have found a description are the American ones,—Johnson's "Operative Surgery" and also in collected papers in the Mayo Clinic in 1913. Dr. Balfour described the carotid body as an intercarotid paraganglion. It seems to be, according to Cunningham, a small red body present in the sheath of the carotid at the point of bifurcation lying rather on the inside. It is abundantly supplied by the sympathetic and derives its blood supply from a small branch springing from the carotid. Growths in this structure extend upwards towards the brain. They produce pressure on the naso-pharyngeal wall so that it projects inwards and pushes the tonsil forwards. There is great difficulty in seeing the Eustachian tube, while on the unaffected side the Eustachian tube projects out in its usual way. Owing to the fact that the growth begins in the sheath of the carotid and on the inside, there is no swelling in the neck.

I was consulted by an elderly gentleman for pain over the right temporal bone. There were no throat symptoms. On looking with the rhinoscopic mirror the right lateral wall of the naso-pharynx was prominent with almost complete obscuration of the Eustachian tube. He had further paralysis of the right vocal cord, hemiatrophy of the tongue and contracted pupil, all on the right side. He had therefore the three nerves involved, sympathetic, hypoglossal and recurrent laryngeal. The prognosis is bad. Operations are quite unjustifiable, especially on the aged. It appears that this body is physiologically a blood gland with structure analagous to the adrenals and coccygeal gland. This patient had no other symptoms present than pain in the temporal region. These growths occur in the young as well as in the old. In the former it may be permissible to undertake operation, but on the aged whose vessels are probably atheromatous, even if the operation is successful, it will probably lead to hemiplegia.

Tumour of the Antrum and Ethmoid.

I have just one more case to add to those already described. It is important from the fact that the diagnosis made after section of the growth did not agree with the clinical results. Patient male, aged forty years, was admitted to the Sydney Hospital with nasal obstruction. He was operated upon by Dr. Marsh for what appeared to be nasal polypi. Three or four days later he was readmitted on account of severe hæmorrhage which was arrested and then he was discharged, to be readmitted with a second attack of hæmorrhage. He then came under my care. At this time he seemed almost exsanguinated. I was afraid to touch him lest he would die under the anæsthetic. The nose was blocked by a growth and the naso-pharynx was occupied by a round smooth tumour which fitted the whole cavity. The antrum on the right side was dark on transillumination. I asked Dr. Bowker who was at that time Senior Surgeon to the Hospital, if he would undertake clamping his carotids during the operation. At the last moment, however, I decided to risk the operation without this precaution. I quickly opened the antrum and found it filled with new growth. This was rapidly removed with forceps. His head was then thrown over the table and a raspatory introduced through the nose. I separated a round smooth growth large enough to fill the whole space. I followed this up by curetting a lot of new growth from the ethmoidal region. I feared the patient would die on the table. After a lingering convalescence he got quite well. The pathological diagnosis was endothelioma. The patient has come to see me repeatedly since and there has been no recurrence. He enjoys perfect health. It appears that we cannot always rely on the microscope. Had the case been malignant I have no doubt it would have recurred ere this. It certainly was not a fibroma, nor was it polypoidal in nature. We are then faced with the question of whether all growths originating in this region have been classified. I was willing to believe that the microscopical finding was correct, but in view of its non-recurrence and the fact that clinically it presented an appearance unlike any we can recognize, it is more than likely that this form of growth has never previously been described.

Post-Nasal Fibroma.

The condition rarely extends beyond the naso-pharynx and posterior part of the nose. However, there are cases which do not obey this rule. A case I had recently was associated with a fullness in the region of the zygoma, but at the time of operation I was disposed to think this fullness might be accounted for by alteration in the blood supply due to pressure. The growth was removed from the naso-pharynx together with a prolongation into the posterior part of the nose running up into the ethmoidal region. The whole growth was completely removed as far as one could see, but a few months later he reappeared with a pronounced growth apparently extending from the posterior part of the antrum up under the zygoma.

Mr. Spencer in 1900 in *The Journal of Laryngology* mentions a similar case. The operation in his case consisted in cutting away the outer wall of the nose anterior surface of the antrum, leaving the orbital plate and alveolus intact. I did not adopt this method in my case. The cheek was split and a second opening made above the zygoma. The growth was then pushed down by means of the finger into the lower wound and removed entirely. Since that time there has been no recurrence.

It is the common practice to split the soft palate and remove part of the hard palate in removing post-nasal fibromata. I have in all my cases dispensed with this practice, preferring to use a raspatory through the nose and pulling the growth from the periosteum. The English school in cases of fibroma advise splitting the soft palate, chiselling a part of the hard palate away and removing the growth in this way. There are a few cases, however, which have come under my observation that cannot be dealt with through the nose. It appears also that this mode of operation is less likely to be attended with recurrence. The position from which these growths spring lends itself to a favourable attack from this quarter. The vault of the naso-pharynx above the superior constrictor, beginning from the anterior surface of the vertebræ, is covered with periosteum. The bucco-pharyngeal fascia is a thin and ill defined layer of fascia which surrounds the constrictor muscles and continues immediately under the mucous membrane as a layer of firm connecting tissue, the pharyngeal aponeurosis, which is closely associated with the muscles and receives some of the fibres. When operating one tries to get under the periosteum, but I doubt if this is ever accomplished and perhaps it is undesirable as it might interfere with the blood supply of the bone. You can feel with the finger that you are under the pharyngeal aponeurosis. The blood supply under this layer is poor and hence the reason that when this space is reached during the avulsion of the growth the bleeding spontaneously stops.

Recovery from Meningitis.

Cases of recovery from meningitis, localized and general, are sufficiently rare to warrant my describing two cases.

The first case was that of a boy, aged fifteen years, who was admitted to the Sydney Hospital with well marked signs of meningitis, together with the history of a chronic discharge from the ear. The spinal fluid was turbid, but no organisms were found nor could any be grown. The usual radical operation was performed. Pus was present in the antrum and middle ear. No improvement took place for some time. His temperature kept in the region of 40° C. (104° F.). He was unconscious for nearly the whole period of his illness. The spinal fluid was withdrawn on several occasions until he finally recovered. The prognosis looked hopeless. Staphylococci were found in the pus, but no organisms were found in the spinal fluid. His ear is now quite healed and the boy is in perfect health.

Erysipelas after Mastoidectomy.

I am tempted to add yet another case to my list, namely a case of erysipelas following operation of acute suppuration of the mastoid. Rutin, of Vienna, told me that since using iodine in the preparation of the skin he had seen fewer cases of erysipelas. At that time I had not met with a case of this kind and was surprised at the remark. However, I have had two cases since and I daresay you will all experience this complication if you practise long enough.

Recently I operated on a case of a very extensive kind, involving the whole mastoid in which I had to completely exenterate the entire bone. This was followed within twenty-four hours by erysipelas of the scalp with a septic chart. The temperature in the evening was 40° C. (104° F.) and in the morning normal. The chart was similar to a lateral sinus thrombosis. The disease usually has no remission of temperature and ends by crisis on the fourth or fifth day. The crisis occurred on the eleventh day and the temperature remained normal for the succeeding nine days. A fresh rise of temperature took place with vomiting, rash on the skin, pains in the joints and suffusion of the eyes. At first I was at a loss to know the cause of this, but remembering I had given him four injections of antistaphylococcus serum I diagnosed a serum disease. It disappeared in less than thirty-six hours and the patient is now quite well.

I have not put before you any sensational cases of recovery. I was reminded of what Professor Hajek said at the time he was invited to a Congress in London. He was found wandering through Hyde Park one morning while the Congress was in session and on being asked why he was not present at the meeting, he replied that he did not come to hear of startling cases reflecting glory upon the reciter, he preferred waiting till the evening to go to the dinner (*in vino veritas*) when the exhilaration brought about by the wine would reveal the truth. They would then tell him of their failures as well as their successes.

I cannot close my address without mentioning with admiration the names of Kilian and Bárány. Kilian has simplified many difficult manipulations and Bárány has opened up a new field which he has well tilled and it is left to us to garner the fruits. Let us not be like the Chians, Galatians and Bithynians, not content with the share of glory or power they have among their fellow citizens, but weeping because they do not wear senators' shoes or if they have them, that they cannot be prætors at Rome or if they get that office that they are not Consuls, or if they are Consuls, that they are only proclaimed Second and not First! Whenever then you admire any one carried in his litter as a greater man than yourself, lower your eyes and look at those that bear the litter. When I wrote my address I felt like a client of Cicero's for whom he had prepared a defence. The client said that when he read it the first time he thought it was good. On the second reading he thought less of it and on the

third he thought it was no defence at all. To which Cicero replied that he forgot that the jury had only to hear it once. I therefore ask your indulgence for the many imperfections of my paper.

NASAL CATARRH

By R. Pulleine, M.B., Ch.M. (Sydney),
Adelaide.

Chronic Simple Catarrhal Rhinitis.

In our daily rhinological practice the individual symptom most frequently complained of is catarrh. From the publicity given to the word by the advertising *Kurpfuscher* nearly every one who is conscious of his naso-pharyngeal secretions, imagines he has the elusive catarrh. I call it elusive as though there are real catarrhs *per se*, the kinds we are most frequently called on to treat are either physiological conditions pure and simple or secretions more or less in excess due to the reaction of the mucous membrane to dietetic or meteorological causes.

The myriad glands and goblet cells of the nasal mucosa are responsible for the integrity of the membrane and the neuro-vascular mechanism behind them is ready to react to any harmful stimulus, chemical, mechanical or thermal. The membrane, as a whole, acts just like the common garden slug does under similar circumstances. The slug pours out its secretions to protect itself, pours them out to the limit of its ability and then if the irritant continues acting it succumbs.

This reaction to irritants is mainly protective and as such is beneficial. It is in fact the first line of defence of our respiratory tract.

If as tiny sentient beings endowed with microscopic eyes we could explore the nasal cavities in the living human organism, we would see a vast, velvety surface formed of the myriad cilia six microns in length which during life are for ever sweeping from the *introitus nasi* to the choana. Amongst them would be the openings of the cups of the goblet cells, each contributing its tiny mucous drop and a far greater number, one hundred and fifty to the square millimetre, of *glandulae nasales* also contributing a limpid flow, as well as myriads of wandering leucocytes in wait for any organisms that pass the barrier of the *vibrissae*.

On these secretions forming the menstruum which conditions the cilia and allows them to work efficiently, all the impurities of the air are deposited and relentlessly swept back to reach the alimentary tract. On their way the bacteria are sorted out by the lymphocytes and disappear. They disappear so rapidly under normal physiological conditions that all observers agree that the Schneiderian membrane may be considered to be practically free of organisms. To visualize the rapidity with which inspired particles are removed, it is only necessary to introduce a little lycopodium or some other inert powder with the powder blower. In a few minutes it has all gone and we can detect it in the pharynx.

To consider all the causes quasi-physiological and pathological or secondary would lead us far but a classification something like the following would cover most of them.

A. *PRIMARY.*
- (a) Mechanical,
- (b) Chemical,
- (c) Meteorological.
- (d) Thermal,
- (e) Contact obstruction in the nose,
- (f) Hypertrophy of posterior ends.

B. *SECONDARY.*
- (a) Chronic catarrhal conditions in sinuses,
- (b) Bacterial conditions in adjacent parts, tonsils, adenoids, teeth,
- (c) Chronic gastric disturbances, chronic intestinal stasis, complicating general diseases, such as myxoedema, nephritis, diabetes and parasites.

Mechanical Causes.

These include inspiration of all inert substances, such as dust and soot, cotton and wool fibres, hairs and spicules from plane, *sterculia* and other street trees, talc in face powders and so forth. Some of these we might dignify as trade irritants, as they are the concomitants of the mining, building, plastering, spinning, engineering and other trades. Others are common to all dwellers in cities where dust is abundant.

Chemical Causes.

Chemical causes often act with the mechanical and thermal. Here we must place tobacco smoking, the most frequent cause of catarrh in men, and alcohol for want of a better place. Apart from these trades where ammonia and formaldehyde are used, contribute their quota.

Meteorological Causes.

Passing on to meteorological causes evidenced by high temperatures and low humidity. We cannot fail to note that at sea or in places like the northern littoral of Tasmania, where the wind blows from the sea, people seldom complain of their nasal secretions. With us, where the wind blows from the land, from a hot hinterland with a zero humidity, our glands must work overtime to keep our cilia in good working order and the approach of summer never fails to bring its sufferers with catarrh, so that we must consider this factor as a contributing cause.

Thermal Causes.

Hot fluids stimulate the mucosa and we may consider hot tea the commonest single cause of catarrh in women. Tea is habitually taken so hot that the finger tip will not tolerate it and the sensitive tip of the tongue gives the message to hurry the fluid back to the less sensitive pharynx. This has to exude or get scalded and the oft repeated insult, coupled with gastric disturbances, gives rise to a real and very chronic change in the glandular mechanism.

Intra-Nasal Conditions.

Sharp contact obstructions in the nose by direct irritation keep up an excessive secretion and greatly magnify the effect of several of the already mentioned factors. The same is true of any other nasal obstruction, be it septal deviation or hypertrophied posterior ends. These moriform bodies so often seen on the inferior turbinates are great producers of secretion and easily excited by thermal conditions in the mouth.

We may leave the primary factors at this and consider the secondary.

Secondary Causes.

Chronic catarrhal sinusitis which has not resolved, is a real cause and commoner than we realize. A vast amount of glairy secretion may go on from sinuses that show no abnormality to transillumination or skiagraphy and the only nasal indication may be an œdematous swelling of the edge of the hiatus semilunaris. One is surprised in washing out such a sinus with Ringer's solution what a quantity of secretion it may contain and we may be sure that behind it is a definite even polypoid œdema of the mucosa.

Bacterial conditions in teeth, tonsils, adenoid remains or infected *foramen caecum* may and do contribute to chronic irritation and exudation of the naso pharyngeal mucosa.

Chronic gastric disturbances, especially where there is pyrosis are always accompanied by a catarrh and the resulting nausea is often attributed to this.

Complicating Diseases.

Myxœdema when well established gives rise to marked increase of exudation of a tenacious consistence and nephritis, diabetes and morbus cordis have nasal discomforts of their own.

Parasites.

In children and weak anæmic women repeated auto inoculations with *oxyuris* keep up an unhealthy condition of the naso-pharyngeal surface.

The Symptoms of Chronic Simple Catarrhal Rhinitis.

The action of an irritant on the nasal mucosa causes, as we have seen, a quick response on the part of the goblet cells and *glandulae nasales*. This activity of the glandular elements is accompanied by an increased activity of the vascular apparatus which gives rise to the resulting engorgement of the cavernous tissue and blocking of the nose. The four areas where this cavernous tissue occurs are the whole of the inferior turbinate, the lower edge and posterior end of the middle turbinate and a large circular area on the middle of the septum surrounding the tuberculum as a centre. The accompanying obstruction may be complete or incomplete, often intermittent and alternating from side to side. The secretion is slimy and on examination contains large numbers of lymphocytes and few organisms of few kinds. When abundant it collects in masses in the inferior meatus and working back falls over the soft palate into the pharynx. This falling of secretion into the pharynx is the chief symptom complained of and the one that brings the patient under our notice. When limpid in character it gives rise to comparatively little discomfort, but when the consistence of the secretion becomes more coherent, considerable difficulty may be experienced in getting rid of it and the sensation of a foreign body behind the palate gives rise to hawking efforts and sometimes to nausea and a tendency to vomit. With the rhinoscopic mirror one may see tenacious masses working down on the pharyngeal wall and the choanæ blocked with the thick secretion and the engorged posterior ends. The olfactory functions are interfered with and smell and taste defective. Sneezing is frequent and fails to relieve, often only increasing the engorgement temporarily. On waking in the morning the condition may be at its worst. If there has been nocturnal obstruction the mouth and throat are dry and a period of hawking and spitting follow the return to consciousness. There is headache and lassitude and there may be dulness of hearing and tinnitus. After the morning meal the symptoms abate, but all day long the falling of secretion into the pharynx continues and in introspective and hypochondriac people may so obtrude itself on the consciousness as to make them thoroughly miserable. They come sometimes with tuberculophobia and cancrophobia and it is hard to make them believe that there is not something dreadful happening.

If there are septic tonsils or a chronic otitis is discharging through the Eustachian tube complaints of foul odours and taste are added to the bill.

Treatment.

The first thing is to make a detailed examination, taking in all the factors, trade irritation and the like which may be suggested by the history (I purposely exclude purulent sinusitis and nasal anaphylactic manifestations from this paper).

After spraying with cocaine adrenalin solution, pencils of wool soaked in the same solution are placed in the nose and on removing these in a few minutes we can then detect any nasal abnormality, septal deviation, contact spurs and œdema under the middle turbinate indicating chronic sinus infection. We also note the condition of the inferior turbinate and especially its posterior end.

In the mouth we go round the teeth, examine the *foramen caecum*, compress the tonsils in search of débris and pus and finally with the rhinoscopic mirror examine the pharyngeal walls for adenoid remains, the lateral fossæ and in ear disease the Eustachian tubes.

With the laryngeal mirror we can see the condition of the glottis and hypopharynx. Where there are evident obstructive conditions in the septum we go after these in the usual way and after washing out a suspected sinus, we treat conservatively or radically as the occasion demands.

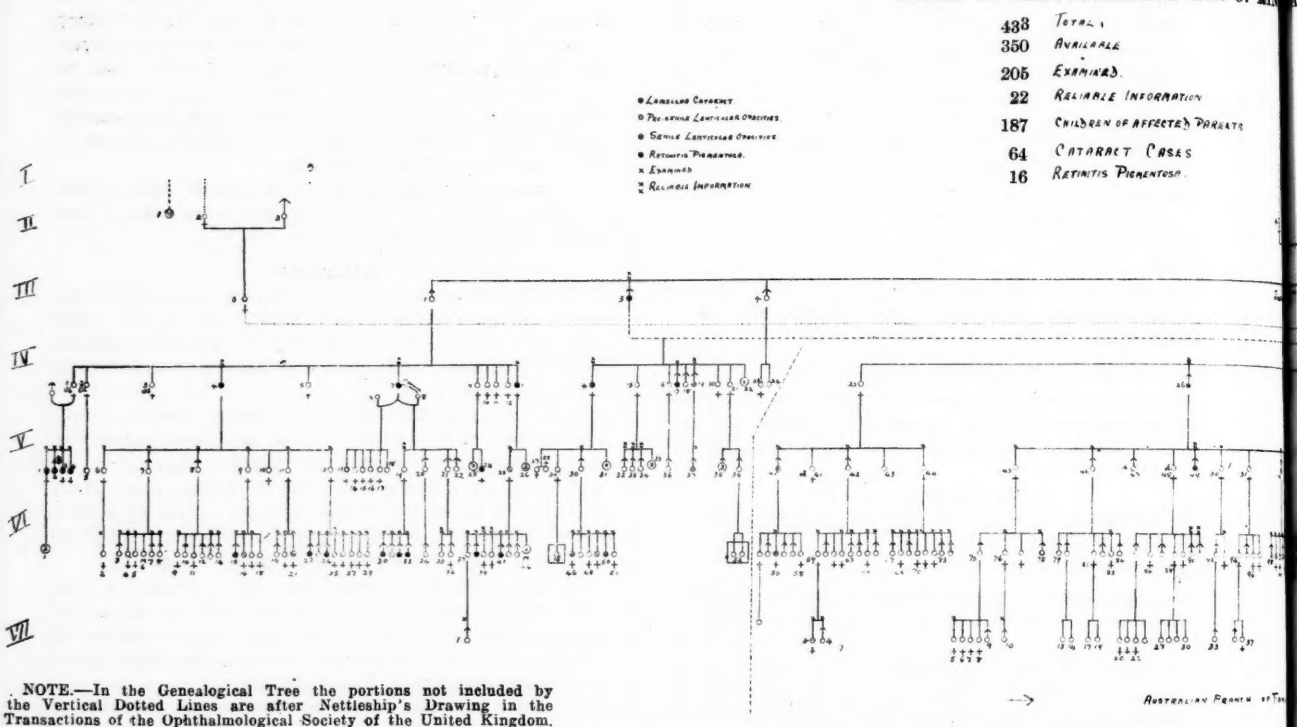
If the tumidity of the inferior turbinate amounts to an obstructive condition, it should be painted with 99% trichloracetic acid after prolonged maximum shrinking with adrenalin. It is usually only necessary to apply this treatment to the posterior end as the chief point of obstruction, reserving its removal to real giant hypertrophies. I have found that two or three thorough applications to this area will reduce all but the largest moriform bodies and then the remainder of the turbinate, though untreated, ceases to be obstructive. I mean that here we should be conservative to the utmost in our treatment of the Schneiderian membrane.

Having treated the tonsils, adenoids, teeth, according to rule, we have done all that surgery suggests.

But there still remains that great majority of mild chronic catarrhs where there is little or nothing to do on the surgical side and if we fail to do something for these they continue to worry and slide off to herbalists *et hoc genus omne*. These are the cases due to trade irritation, faulty dietetic and hygienic conditions and those people with sensitive mucosae who suffer from dust and meteorological conditions. These, after all, are the ones that most often ask our help and for whom we can do much.

After correcting, if we can, all dietetic faults and

FIGURE I.—ILLUSTRATING DR. J. RIDDER



NOTE.—In the Genealogical Tree the portions not included by the Vertical Dotted Lines are after Nettleship's Drawing in the Transactions of the Ophthalmological Society of the United Kingdom.

habits, including the ingestion of hot liquids, the taking of alcohol and the use of tobacco and the hygienic by ventilation and sleeping in the open, there remain the douche, the inhalation and lubrication.

All people who suffer from dust or dusty trades, should use the douche. Ordinary standard Ringer is the ideal solution and the enema syringe with a tube attached the ideal way of applying it. With the head well forward and mouth open a litre of Ringer's solution should be pumped into one naris and allowed to flow out of the other. With each pump of the syringe a nasal expiratory effort should be made. This detaches and expels all the nasal secretion with the dust and dirt round the introitus. The quantitative result is often unbelievable. Often some fluid gets into the antra. This may be drained off by holding the head well down and it does more good than harm.

The next point is lubrication. This is best done by applying a viscid petrolatum through a de Vilbiss or other spray. Nebulizers are inefficient when a good application is wanted and a lot of the commercial liquid petreleums are too thin and impure for our purpose. Some even cause pharyngeal irritation and coughing.

Another way of applying lubrication, especially at night, is to place a pill-shaped plug of wool soaked in soft paraffin well forward in the vestibule, pushing it forward with the finger tips. In this position it holds the nares open and acts as an oil gland, keeping up a continuous lubrication all night.

People with slight anterior nasal obstruction derive great satisfaction from this method and strangely enough after some weeks or months can do without it owing to improved action of the alæ nasi.

Finally there is the inhalation. It is possible to influence the surface tension of the nasal secretions by certain substances and the best is menthol dissolved in rectified spirits. This used as a scent on the handkerchief gives untold relief in chronic catarrh, reducing the obstruction, opening up the Eustachian tubes and giving rise to a feeling of well being. It is the best thing I have found for nipping a common cold in the bud.

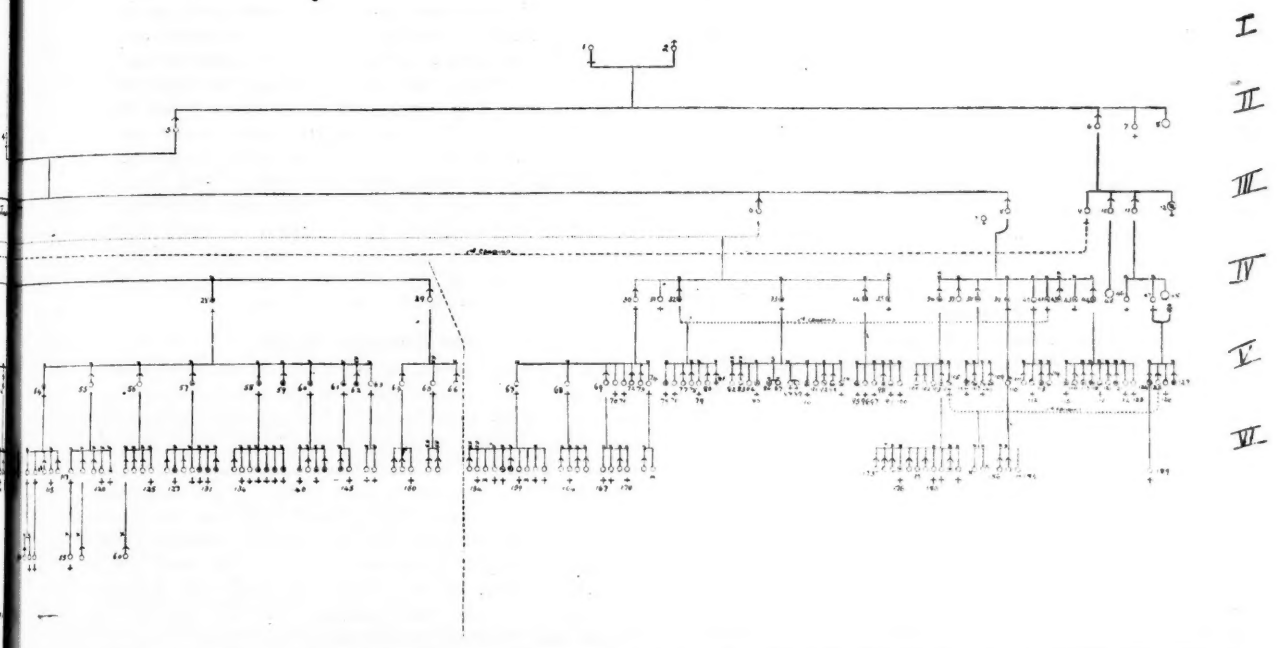
There only remain those catarrhs which accompany cardiac, renal, diabetic and endocrine conditions and the treatment sketched can be beneficial also in all of these, apart from the special therapeutics applicable to each disease.

REMOTE EFFECTS OF CHRONIC TONSILLITIS.

By C. M. EADIE, M.B., CH.B. (Melbourne),
Melbourne.

CONSIDERING the tonsil as a source of infection for the body one is struck by its anatomical position situated as it is in the oro-pharynx between the two pillars of the fauces. The cavity abounds with micro-organisms, the food passing over the crypts during the act of swallowing. The tonsil is surrounded by muscles that contract during

ANDERSON'S PAPER (See Page 363).



the act of deglutition, *id est* the *palato-glossus* in the anterior pillar, the *palato-pharyngeus* in the posterior pillar and the superior constrictor of the pharynx forming the outer wall. Below is the fibrous fold, *id est*, the *plica triangularis* which is further supported by the base of the tongue, so that in swallowing pressure is exerted on the tonsil from its deep to its superficial surface, causing the contents of the crypts to be emptied into the mouth and in this way retention of débris is guarded against. But nevertheless the structure of the tonsils is such that it favours retention of secretion and growth of organisms. The crypts extending from the surface down towards the capsule are of varying length and in many cases branching. The epithelium in early life of a delicate stratified squamous type later becomes much reduced in thickness and broken in continuity. The crypts become occluded either by plugs of secretion or as the result of inflammatory changes with increase of fibrous tissue, causing strictures or complete obstruction of the canals. Thus the open canal becomes a closed cavity containing a material teeming with organisms which together with the toxins may become absorbed by the tissue fluids in the tonsil, draining thence *viâ* the lymphatic channels mainly to the tonsillar gland which is situated just under the anterior border of the sterno-mastoid at the level of the angle of the jaw. The organisms may remain lodged in the tonsil tissue itself. It would appear that the particularly infected tonsil, the one that is most likely to be giving rise to symptoms of toxic absorption, is the one in which from inflammatory conditions, acute or chronic, there has been stricture of the crypts with destruction of the cryptic epithelium and retention under gradually increasing pressure of septic débris. The mere presence of secretion in the crypts in itself does not mean that the tonsil is causing trouble. The history of previous attacks of tonsillitis or quinsies is of very great importance. That the tonsils have not been inflamed for a long period does not mean that they are causing no harm. Very often no acute attack has been present, but a more or less constant soreness of the throat. The signs of these previous inflammatory conditions are to be looked for and here one particularly looks for crypt obstruction. The crypts opening into the supra-tonsillar fossa are particularly liable to become blocked, on account of their position and the pressure action of surrounding muscles not being so effective. Cysts are formed and appear when superficial as yellowish spots varying in size shining through the mucous membrane. But just as frequently they form in the body of the tonsil or nearer the deep capsular surface, being found only on examination after tonsillectomy. Scarring of the surface of the tonsil and adhesions between the tonsil and the pillars of the fauces are also to be noted. The flat, embedded tonsil and the large hypertrophied tonsil are both more liable to retention of septic débris, the pressure emptying of the crypts not being so effective and inflammatory changes more common. One that just comes flush with the edges of the pillars of the fauces seems to be less liable to retention. The appearance of the surface of

the infected tonsil varies very much, perhaps the friable-looking tonsil and the hypertrophied one with many crypt orifices are the two more to be condemned. Chronic congestion of the mucous membrane of the surrounding parts should be noted. Usually there is hyperaemia of the anterior pillars particularly in its superior aspect extending along the soft palate. An irritable pharynx, bad taste in the mouth and pain at the back of the neck are symptoms that are often associated with diseased tonsils. The presence of enlargement of the tonsillar lymphatic glands is of especial importance in deciding the likelihood of toxic absorption taking place.

Dr. Williams, Superintendent of the Melbourne Hospital, very kindly made a bacteriological examination of the tonsils from some forty-one patients. These were patients who were suffering from some systemic infection and the tonsil was thought to be a likely focus. Dr. Williams report is as follows:

Technique.

The tonsils were removed and place in a sterile Petrie dish. A crypt was selected and the exterior seared with a red hot knife. Then a sterile platinum loop was introduced into the crypt and a loopful of septic material was introduced into broth. This was incubated for twenty-four hours. A loopful of the culture was then smeared over blood-agar plates, incubated for twenty-four hours and examined. Streptococcal colonies were identified and a colony picked off and again introduced into the broth. This was incubated for twenty-four hours. It was then examined and a loopful of the culture introduced into broth containing the following sugars: inulin, salicin, mannite and lactose and a loopful was also smeared over blood-agar slopes. The results were as follows. Forty-one patients were examined. Haemolytic streptococci were recovered from thirty-three; non-haemolytic streptococci were recovered from eight. *Streptococcus pyogenes* was the predominant haemolytic organism in 50% of the patients. The non-haemolytic streptococci were introduced into guinea pigs and their virulence was found to be comparable with that of the haemolytic variety. I am convinced that the presence of such streptococcal growth in the tonsil must be a definite menace to the general health.

In considering systemic infection arising from infection in the tonsil it would seem that the patient's general resistance to bacterial infection, his degree of immunity, is of the greatest importance. Probably up to a certain point the tonsil helps to bring about this relative immunity by stimulating the production by anti-bactericidal bodies. But when the resistance is ineffective either temporarily or permanently, then the presence of an infected tonsil is a danger and its removal is indicated. There is a very varied list of different systemic infective processes attributed to tonsillar infection, but recognizing the fact that a low or high degree of septicaemia can be caused by absorption this is not surprising. It would appear that the actual infecting organism is a member of the streptococcus group in the great majority of cases. There is absorption of the toxins and also entry of the actual bacteria into the tissues and circulating fluids of the body. Considering the results of tonsillectomy on disease of each particular system the particular system affected would appear to be due to either inherited or acquired lowered resistance of the tissues of that system, though Edward Rosenow in some recent experimental work by intravenous injections into animals has pointed out that a particular strain of streptococcus does show a definite affinity for a particular tissue. Taking the arthritic cases the results up to four years after operation in twelve patients show improvement in every one and in seven there has been no recurrence of the pains at all. It would seem probable that in old standing rheumatic affections secondary foci become established in the joints themselves and the result of removing the tonsils would not be so effective in giving relief. A male, aged twenty years, had an attack of acute rheumatism once a year for four years. He has had no acute attack since tonsillectomy and practically no pains in his joints. I would include myself in this series. The joints of my fingers and elbows were affected; so far there has been no recurrence of pain or stiffness four years after tonsillectomy.

The Alimentary System.

The bad taste in the mouth and bad breath are very often due to the infected débris in the tonsillar crypts and are removed by tonsillectomy. Where there is gastritis the removal of such infective material from entry into the stomach must be beneficial, more particularly where the total acidity of the gastric juice is low. I can only quote two definite cases here. One patient states that she is now able to eat almost anything with comfort, whereas before operation she got indigestion attacks with many things that she can now eat and enjoy. The other had a gastric ulcer and this also was operated on. She has put on weight and improved considerably.

The Cardio-Vascular System.

The association between cardiac lesions and tonsillar infection is frequently demonstrated clinically in cases of endocarditis and pericarditis following acute tonsillitis. Then in cases of acute infective endocarditis removal of infected tonsils have appeared to stop the progress of the disease. One case in particular I call to mind of a youth, an immigrant, who developed acute endocarditis. He had been under treatment some time before I saw him. He was advised to have the tonsils removed but refused. Then about three weeks later, his condition not having improved, he agreed to the operation. A few days after the temperature dropped and in two weeks he was out of bed and became well enough to go on board to return to Scotland. *Streptococcus viridans* is generally associated with endocarditic lesions.

Goitre.

Clinically, infected tonsils and enlarged thyreoid glands with or without thyreo-toxic symptoms are often observed and the record of cases show much improvement after tonsil enucleation. In some cases the swelling has quite subsided and the rapid pulse and tremor have disappeared. In others there is still some enlargement, but with great improvement in the general symptoms. In one of the patients after great improvement there was a recurrence with return of thyreoid enlargement and thyreo-toxic symptoms two years after the tonsillectomy. Here there was a considerable hypertrophy of the lingual

tonsil and it is interesting to note that Sluder considers that the lingual tonsil is the one usually if not always to blame for disturbance in the thyreoid gland. In some cases of enlargement without hyperthyreoidism after attacks of quinsy thyreo-toxic symptoms develope and these are relieved by tonsillectomy. And one notices often during an attack of acute follicular tonsillitis some enlargement of the thyreoid gland. Of ten patients in one series on whom I operated, I am informed by the physician in charge that six are regarded as cured. Three show much improvement and in one there is no change; here some pelvic infection is present.

Nervous System.

Patients with general nervous debility improve very much. Chorea and epileptic fits have been much improved. Where the nervous system appears to be unstable, the patient being more irritable, "living on edge" so to speak, the removal of infected tonsils has given great benefit. In three epilepties operated on, one, a boy aged twelve years, who had fits almost every day, now over a year since has no fits. In an adult, aged twenty, they have been much less frequent and severe.

Skin.

In two patients with *purpura haemorrhagica* the skin lesions cleared up and there has been no recurrence. Two patients with *lupus erythematosus* are both steadily improving.

The Glandular Group.

Enlarged cervical glands are very commonly found associated with unhealthy tonsils and one notices great reduction after tonsillectomy. In two cases with unilateral swelling, after tonsillectomy the swelling subsided completely. Of three cases of tuberculous adenitis in children with abscess formation in two the swelling subsided in a few weeks; in the other the swelling subsided, but a puckered scar remained where the abscess had broken down.

In practically all the cases investigated one notices the marked improvement in general health after removal of the tonsils. In no case was the patient worse in general well being; some complained of the throat being uncomfortable and one in particular of great soreness, though on examination I was unable to discover any local trouble to account for it. This well being after removal would seem to confirm the opinion that from infected tonsils there is a continuous absorption of toxins into the body. The fact that many with obviously septic tonsils still carry on without any apparent symptoms, would be explained on the assumption that the protective mechanisms of the body were high and quite able to compete with the chronic low grade infection. From this point of view it might be suggested that the continuous absorption acting by stimulating the production of various antibodies would tend to keep up the resistance offered by the body to infection, but the balance is too easily upset and there are other lymphoid collections from which this vaccine action can still be maintained without so much risk of an overdose. On inquiring from medical practitioners on whose patients I have operated, I have not been told of any in whom there was any increased susceptibility to the infections after tonsillectomy, either children or adults. Disease is caused by the victory of micro-organisms in their attacks on the body and the different foci from which their entry takes place must receive adequate attention in order to combat that disease. In finally deciding in a case of systemic infection whether or not infected tonsils should be removed with the idea of improving that condition, the final recommendation should come from the physician in charge who would be cognizant with the state of other possible foci of infection. The results would seem to justify removal in the following: Acute nephritis, neuritis, arthritis, myocarditis, endocarditis; iritis; earache, chronic suppurative *otitis media;* gastritis, appendicitis; cervical adenitis, tuberculous adenitis, goitre; chorea, nervous debility, epileptic attacks; *purpura haemorrhagica, lupus erythematosus,* nasal stuffiness, post-nasal dropping, febrile attacks in children.

In conclusion I must apologise for the small number of cases recorded, but I found it very difficult to follow up the patients, to get them to reply. However, I feel that it would be very helpful if members present would express their views on this subject.

Dr. Herbert Marks said that he had adopted the method of George Waugh as a routine operation for the removal of tonsils. He always employed intra-tracheal anæsthesia, one of the advantages of which was the suction apparatus connected with the electric motor of the anæsthetic machine. In operating his first step was to make a small opening into the supra-tonsillar region with the object of defining the capsule of the tonsil. He then grasped the upper pole of the tonsil with a conchotome and proceeded to separate the posterior faucial pillar. By attending to this phase of the operation before the field was obscured by bleeding, it was possible to preserve a maximum amount of mucous membrane.

He secured all bleeding points as they arose and ligated them. When separation was effected as far as the lower pole of the tonsil. he slipped a snare over the lower pole and thus completed the removal of the organ.

Dr. H. S. Marsh expressed a preference for local anæsthesia in performing tonsillectomy in adult patients. He wished it to be understood however that he did not employ local anæsthesia unless he had previously determined that the patient was a suitable subject. If the patient could tolerate pressure on the tongue without "gagging" he regarded him as suitable for local anæsthesia. Speaking generally he had found women better subjects for local anæsthesia than men.

After giving a preliminary hypodermic injection of morphine and atropine he painted the fauces and tongue with a 20% solution of cocaine. He then injected a solution of "Novocain" (0.5%) of which one cubic centimetre contained 33.7 milligrammes of adrenalin chloride, under the mucous membrane all round the tonsil and below it.

Dr. Marsh intimated that he operated by the Boston method as described by Wright and Smith. The tonsil was drawn forwards and a small incision made about the centre of the anterior faucial pillar. The next step was to pass a curved blunt-ended bistoury all round the tonsil separating it from the mucous membrane and submucous areolar tissue until the pearly white capsule was exposed. The limits of the tonsil were defined with a blunt separator of the type designed by Hurd, and on the completion of this stage a "Beck-Müller" snare was passed over the tonsil. This was left in position for five minutes before the tonsil was amputated by the *écraseur* method.

He had found that very little hæmorrhage occurred when the operation he had outlined was adopted. If bleeding seemed likely to be troublesome, he ligated the offending vessels.

Dr. Marsh said that he had seen post-operative hæmorrhage, but not of a serious degree, once or twice after tonsillectomy by local anæsthesia. When the patient was of the type not suited for local anæsthesia, he preferred ether administered by the intra-tracheal or the intranasal method for adults. He considered the "Sluder" operation the method of choice for children up to twelve years of age.

Mr. W. Kent Hughes showed some bad types of guillotine with and without harpoons and deplored the fact that such instruments were not only sold, but sold in large quantities both to older practitioners and to young graduates.

Many years ago he was an enthusiastic advocate of local anæsthesia, but having experienced frequent trouble from post-operative hæmorrhage, he had abandoned it. Tuberculous patients provided the single exception to his rule of avoidance of local anæsthesia. He was astonished to hear that those who used a crushing guillotine had no trouble from post-operative hæmorrhage. He understood that hæmorrhage was quite a common occurrence and that many fatalities had occurred in Melbourne during the last few years in the practice of those who used a Redpath guillotine.

His own practice was to use a blunt guillotine as a grasping instrument, to pull the tonsil as far out of its bed as possible and to dissect the anterior faucial pillar off the tonsil. For this purpose a long pair of scissors curved at the tip was very suitable. The scissors were passed over the capsule and the upper pole of the tonsil dislodged from the supra-tonsillar fossa. It was very seldom necessary to cut the upper pole away from its surroundings; if the posterior pillar were found adherent to the tonsil, the adhesions should be cut and not torn away. The lower pole might be avulsed in the majority of instances, but it was occasionally necessary to dissect it out.

With reference to the control of hæmorrhage Mr. Kent Hughes said that if the vessels entering the upper portion of the tonsil were very large he applied a pair of Spencer Wells forceps and twisted them. He had never employed ligatures or sutures having relied always on clipping and torsion of the vessels.

Dr. R. H. Pulleine exhibited the Waring suction apparatus described in *The Laryngoscope* (August, 1923) and demonstrated the manner in which it was used. For enucleation of tonsils he preferred to operate with a snare under local anæsthesia. After the preliminary step of detaching the pillars he pulled the tonsil into the loop of the snare with a pair of bullet forceps. He experienced little or no hæmorrhage and thought that a small amount of bleeding might be looked upon as beneficial rather than otherwise.

Dr. Frank Andrew said that he considered the average text-book description of the operation of tonsillectomy of very limited utility; the operations described related as a rule to the nicely rounded tonsil which had not been the object of any attempt to enucleate it. With a little practice anyone could attain proficiency in the removal of tonsils of this character. The discussion would be of most value if it centred round those tonsils which presented difficulty on account of previous attempts at tonsillectomy, the occurrence of quinsy or worst of all ill-advised cauterization. He believed cauterization of the tonsil marked the extreme of operative stupidity, but it was still performed.

It had been mentioned in regard to intra-tracheal anæsthesia that an instance had occurred in which the withdrawal of the catheter showed the presence of clotted blood along the intra-tracheal portion. He thought that such an experience was to be connected with the particular type of anæsthetic machine employed. He had used very largely the machine devised by Dr. Mark Lidwill and had found that, although it was excellent in the feature of portability, it did not deliver sufficient air per unit of time to abolish air intake. He therefore preferred the Kelly machine which delivered a very large amount of air. The criterion of efficiency adopted was to place the ear to the patient's open mouth, when a continuous hissing escape of air should be heard during both inspiration and expiration. If this condition were not fulfilled, a suction apparatus must be used in conjunction with the pressure supply and this was an embarrassment to the operator. He used intra-tracheal anæsthesia in every patient without exception and irrespective of age. In all ordinary cases he removed tonsils by the Redpath guillotine. This method had the advantage of effecting a very real economy of blood, and further the post-operative pain was surprisingly less than that which generally followed the open method. He attributed the diminution of pain to the fact that the raw surface was covered with a layer of tissue the nerves of which had been paralysed by crushing.

He had not seen reactionary bleeding after any operation in which the Redpath method had been carried out completely. A proportion of bound down tonsils which could not be manipulated through the fenestrum of the Redpath guillotine could be removed with the Sluder guillotine. In such cases he packed the pit with gauze and applied pressure until hæmostasis was secured before proceeding to the opposite side. Bleeding occurred in but few and he found that whenever a sharp hæmorrhage occurred, it usually happened just after the blade of the guillotine had been sharpened. When the blade was over sharp, it might not select the plane of areolar tissue between the capsule and constrictor muscle and was apt to snip out a piece of muscle if the operator's finger should press the tonsil too firmly through the fenestrum of the guillotine.

In the really difficult scarred tonsil, welded into its bed like a knot in a plank some type of dissection removal was imperative. Here and here only could he see any advantage in local anæsthesia but in the circumstances bloodlessness was a prime consideration.

He injected a solution of "Novocain" (0.25%) to which was added only one drop of adrenalin chloride (1 in 1,000) in each seven cubic centimetres. He used the relatively large amount of from thirty to forty-five cubic centimetres for the injection of each side. Dr. Andrew always used the Mayo clinic gold needle and said that he took care to see that it was blunt in order to avoid the risk of intra-venous injection. The tonsil was grasped with a volsellum, pulled well forwards and the incision made in front, above and behind. The dissection was carried on with curved blunt-pointed Mayo scissors and removal completed with a snare.

Dr. Andrew said that he had performed tonsillectomy for a number of singers and a proportion of them had reported that the upper limit of their register had been raised as much as one or one and a half tones. Occasionally when complaint of vocal damage was made, he had thought that this might be connected with adhesion of the posterior to the anterior pillar. In these people he packed the fossa with gauze soaked in compound tincture of benzoin and left the plug in for some hours. During

after-treatment the finger was occasionally passed round the pit to prevent the formation of adhesions.

Though he believed the Redpath method to be completely satisfactory in preventing reactionary bleeding, it would not obviate the occasional occurrence of secondary hæmorrhage nor would any other method until a type of patient with an aseptic throat was produced. Tonsillectomy in singers was frequently a matter in which there was very little option, for they made complaint that whenever they secured an engagement, they developed a sore throat and had to disappoint the *entrepreneur*.

Dr. Gilbert Brown discussed the question of anæsthesia. He preferred a general anæsthetic, ether, administered through a nasal tube the appropriate size for which for an adult was represented by a No. 28 French rectal tube. Ether might be given by the Shipway apparatus with foot-pump or oxygen cylinder as blower. The Beck-Müller, Connell or Yanakeur ether insufflation apparatus combined with a sucker was very satisfactory and delay occasioned by the passing of an intra-tracheal catheter was avoided. No one who had used a suction apparatus, would ever return to swabs and he had noted that when swabbing was to a great extent eliminated by the use of a sucker, the bleeding was appreciably less. Hæmorrhage was to be dealt with on ordinary surgical principles which was to say that the bleeding points should be found and ligated. Patients who needed secondary ligature, were as a rule very blanched and were bad anæsthetic "risks." During the last year he had been called upon to administer anæsthetics to five or six patients for the control of secondary hæmorrhage after tonsillectomy and the original operation was performed by a different surgeon in every instance.

Dr. T. S. Kirkland said that his method of procedure in tonsillectomy was to incise with a scalpel until the correct plane was reached when he stripped the tonsil from the pillars with the fingers. He completed the operation with the snare. He believed that post-operative scarring resulted when the surgeon did not get into the right plane and cut too closely to the anterior faucial pillar.

INTRACRANIAL SUPPURATION OF OTITIC ORIGIN.

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It is not intended to discourse on this subject, but to discuss some practical manœuvres of whose value experience has been gained. In considering the lesions commonly met they will be taken in anatomical order from without inwards.

Extra-dural Abscess.

Extra-dural abscess calls for little comment save to emphasize the fact that it exists far more often than it can be diagnosed before operation.

It is rather surprising to note how the operator is urged to avoid exposing the *dura mater* in mastoid operations.

It has been my practice to expose it in practically every case and it is surprising how often granulating and thickened *dura* with more or less pus is found above the *tegmen*.

In all cases where headache has been a feature of the patient's symptoms the *tegmen antri* is removed freely and the *dura* elevated forward to get a good view over the *tegmen tympani* and inward over the petrous. In any case where the *tegmen tympani* is not sound, clean bone, it is freely removed. The sole necessary safeguard is that *dura* exposed must be freely exposed. It is not out of place here to point out how completely a purely extradural abscess can imitate an intracerebral one. I have seen a tiny collection of pus at the tip of the upper margin of the petrous give the signs and symptoms of a crural lesion (Weber's syndrome) and two cases where extradural abscess in the floor of mid-cranial fossa gave classical signs of tempero-sphenoidal abscess. All the patients recovered.

Should the lateral sinus be part of the wall of an extra dural abscess, the same rule holds good. Where the sinus is actually thrombosed, it is exposed to a point above the level of the thrombus; the bleeding torcular end is compressed by a pad of gauze immersed in bismuth-iodoform-paraffin paste inserted between the outer wall of the sinus and the bone and the outer wall of the sinus removed as a ribbon to a point below the clot, if that can be reached without the elaborate operation necessary to expose the jugular bulb from behind. The lower end is then compressed like the upper by a similar pack. If the clot extend down into the bulb, it is raked out with a smooth blunt spoon till free back-flow bleeding occurs; if this be not achieved, then only is the jugular ligated in the neck through a clean separate wound. The attitude that a thrombosed sinus or rigors occurring before operation necessitated jugular ligation has been abandoned with the feeling that if the sepsis on the spot have been properly treated, it is a superfluous manœuvre, if not an inadequate one. Action based on this attitude has caused no regrets.

Intra-dural Infection.

Meningeal.

This may be a diffuse or localized lepto-meningitis. The diagnosis here is not usually difficult and the main point to emphasize is that we should not too easily despair especially in children. The removal of the source of infection should be done before the outset of this complication, but when we are deprived of the opportunity of rational early intervention, it should be done at the first possible time and accompanied by the relief of the subtentorial pressure by means of the method to be described.

The localized form if diagnosed at all will almost certainly be taken for a brain abscess and if found, can be dealt with as a wide open infection after incision of the *dura* with a good prospect of success.

Intracerebral.

Diffuse infective encephalitis need not be discussed, as treatment beyond the removal of the infective cause does not exist. There are then to be considered the intracerebral abscesses. These may be divided into two groups only because treatment and prognosis alike depend on whether the abscess be (i.) stalked or (ii.) at a distance.

At this point may I enunciate some principles to focus discussion. Continued reflection on my cases has led me to believe that the problem of curing a brain abscess when found resolves itself into three main aspects, avoidance of infection of the meninges, avoidance of such manipulation as will produce œdema or bleeding within the cranium, and prevention of death from medullary compression.

The first object is best attained if the abscess can be drained along its stalk. The prognosis is so very much better in this than any other method that it is reasonable to say that every abscess likely to be of otitic origin and homolateral to the infected ear should be sought primarily by the route of a mastoid operation; only when most careful search has failed to reveal a stalk is it right to attack the abscess through meninges unprotected by adhesions.

Finding oneself in this strait, one's procedure will be influenced by the urgency or otherwise of the patient's condition. In any case we can turn down a very small dural flap about the size of a sixpenny piece. This permits the search for the abscess without the risk of wounding cortical vessels. I do not expect it to be challenged that it is absolutely impermissible to plunge a knife or any other instrument into brain through *dura,* because of the impossibility of knowing that cortical vessels will be avoided and because of the highly disadvantageous condition which exists for the management of an abscess so entered.

The small opening favours the prompt formation of a small tight hernia which gives the best immediate protection of the meningeal spaces. Through the hernia the search can be conducted at once if the condition be urgent. I use a pair of Heath's forceps with channelled blades and bluntly sharp points. These are advanced into the brain a little way and slightly opened, shut and advanced again and so on till pus issues between them, the blades are then immediately shut and the drain cone which has been lying in the grasp of more slender forceps is slipped down between the blades as they are reopened and so into the cavity.

In a case presenting no immediate danger the operation can end at the making of the dural flap for some hours or days and then search for the abscess may be conducted when adhesions or a hernia have shut off the meningeal space.

The avoidance or reduction of the risk of cerebral œdema or bleeding depends on gentleness of manipulation. I have been impressed by the reality of the risk of œdema. A brain abscess of large size is opened in a one stage operation; one feels a glow of satisfaction at the gush of pus, but let us consider a little what has happened.

The intra-cranial tension has been rapidly and greatly reduced, the brain falls away from the dura, cerebrospinal fluid is slopping back and forth with every respiratory excursion of the brain carrying infected material out into the meningeal spaces. The patient then will have a good chance of dying in a few days of meningitis, but death may easily come on in a few hours from general cerebral œdema, due I firmly believe to an overgreat and overrapid drop in tension. I lost two patients (one with a stalked abscess) in this disappointing way.

I now do all I can to limit the escape of pus. The instant it appears the blades of the seeker forceps are shut. They are only separated again to allow the rubber cone to be slipped in between them and at each change of drain this is only slipped out as the new one is ready to slip in again. The complete evacuation of the abscess is thus spread over a period which has varied from five to twenty days. In such manipulations pus will escape in proportion to the need.

If the abscess pressure be high, nothing can prevent a good deal from escaping, but I am sure that two calamities must be prevented in every possible way, the falling back of the brain from the *dura* and the rapid and complete emptying of large abscesses. There remains one very important consideration and that is how to keep the patient, who is often *in extremis,* alive long enough to give the mechanism of recovery a chance, for very often the patient is dying of bulbar pressure when we first see him.

I feel that subtentorial decompression as we mean it in neoplastic cases is out of the question. We have got to clear the mastoid on the affected side and a free unilateral subtentorial decompression on the opposite side besides being an inherently dangerous step in any case where tension is high enough to make it seem desirable, is a lengthy business in the most skilled hands and we have no time to waste in these cases.

In 1917 for the first time I practised the manœuvre here described and it has been used since in every case where there was need. The mastoidectomy being complete the cerebellar *dura* is freely exposed over the lateral sinus in its descending part and upper knee, the exposure being carried well behind its posterior border.

The bone anterior to the descending sinus is removed as far forward as avoidance of the semicircular canals in the presence of a live labyrinth will permit and the solid wedge whose inward directed margin corresponds to the lateral attachment of the tentorium, is wholly removed within these limits. This creates a deep pyramidal space whose roof is the dural floor of the middle fossa, whose anterior wall is the cut posterior part of the petrous and whose posterior wall is the cerebellar *dura* anterior to the lateral sinus.

I suppose in the first years of the war we all read the tragic suggestion that decompression could be accomplished by removal of bone from the lateral wall of the middle fossa without incision of the *dura.* It was obvious to anyone who had ever handled the *dura* at the side of the skull that such a dense tough structure could only yield a little to immense intracranial pressure and the decompression so accomplished was nil. I am not asking you to contemplate repeating such a jest.

The manœuvre described consists in exposing a strongly re-entrant angle the greatest part of whose boundary, moreover, the antero-lateral cerebellar *dura,* is so thin that details of cerebellar surface can often be seen through it. Any who try what has just been described, can satisfy themselves how this angle fills up and bulges and how in a severe case respiration at once increases in vigour.

I have no experience of continued drainage of meningeal spaces. It seems largely impossible and even granted its possibility, its desirability into an infected area seems doubtful. The lateral cistern can be incised by this method more easily than by the trans labyrinthine route and without the danger to the seventh nerve which that route must entail.

The value of lumbar puncture seems to me to lie chiefly in relieving the patient's distress after operation, especially in cases where meningitis is a feature. Its use before operation seems very small and its dangers great and

probably should be limited to the withdrawal of two or three cubic centimetres for examination. I have not been able to satisfy myself that its post-operative performance has any therapeutic value except the relief of headache which is certainly important, but in the absence of that indication I no longer perform it.

Labyrinthine sepsis must be considered with the intracranial infections firstly, because while it exists the developement of a frank intracerebal sepsis is an ever present danger and secondly because sepsis of the labyrinth alone can produce a state practically indistinguishable from a brain abscess.

Infection of brain from the labyrinth seems to run two types of course. In the rapid invasion of the labyrinth as the extension of an acute *otitis media* there is the possibility of rapid spread to the cranial contents by two easy routes, along the eighth nerve and along the *ductus endo-lymphaticus*.

The first is probably always fatal for the infecting organism makes its way immediately into the bulbar tissue and septic encephalitis results. Spread along the *ductus endo-lymphaticus* is less disastrous because there is a reasonable chance of effective local lepto-meningitis sealing the spaces. The infection then tends to spread out into the deep wall of the lateral sinus and in to the cerebellar hemisphere. This probably accounts for those cases of thrombosed infected lateral sinus with immediately subjacent cerebellar abscess which occasionally occur. In the more chronic suppurating labyrinths spread is far more likely through internal auditory meatus quietly into the anterior part of cerebellar hemisphere or through a slowly produced bony defect in the posterior wall of the petrous or some other spot.

In the acute purulent labyrinths what are we to do? I must confess that I am less willing to dogmatize on this than on any other aspect of this worrying group of cases. The difficulties are that a certain diagnosis of diffuse purulent as opposed to serous labyrinthitis may be most difficult. I have seen three in whom an absolutely functionless labyrinth never suppurated.

In one patient with a purulent labyrinthitis who died of septic extension along his eighth nerve, six or seven weeks later symptoms were so mild that one had to doubt the diagnosis. If we have no doubt, what is to be done? The results of early labyrinthectomy have been so disastrous in all hands that there seems to be a consensus of opinion that we must wait for some walling off. Yet we cannot let a perhaps furiously suppurating mastoid wait long and if we be forced to operate on the mastoid, to do that only is well calculated to produce a flare up in the septic labyrinth and intracranial extension.

When next I find myself in the dilemma, I shall go right ahead when the mastoid or middle ear state demands it and in a furious case do the widest possible labyrinthectomy. If the ear infection were mild, I should do labyrinthectomy as soon as things were quiet, say in fourteen or twenty-one days. Never again shall I consent to any patient's passing out of control with a functionless labyrinth even if its infection be only probable.

Dr. J. Stoddard Barr referred to experiments bearing on the treatment of purulent meningitis carried out by himself in 1909. In a patient who had died of cerebro-spinal meningitis, he performed lumbar puncture and in addition punctured the lateral ventricle through a small trephine opening. On entering the meninges a small quantity of turbid fluid was obtained but it soon ceased to flow. By means of a funnel and tube held a short distance above the head, he introduced some water coloured with fuchsine through the cannula into the lateral ventricle. In a few seconds turbid fluid began to flow from the spinal meninges and in one minute the coloured fluid appeared. The next step was to determine the track of the coloured fluid by examination of the brain.

From the lateral ventricle it flowed through the third ventricle into the fourth and so by way of the foramen of Magendie into the sub-arachnoid space. Anteriorly the fluid found its way as far forward as the optic nerve sheaths.

It was discovered that in addition to the foramen of Magendie subsidiary openings connected the ventricles with the sub-arachnoid space. These openings were two in each lateral wall of the fourth ventricle and one at the tip of each inferior cornu of the lateral ventricles. He believed that the fatal issue in acute purulent meningitis might occasionally be avoided by continuous irrigation through the lateral ventricles to the spinal meninges.

Dr. G. Halloran said that the mortality attending radical operation on the labyrinth was approximately 60% and he had doubt whether it should be generally practised. Many individuals treated by conservative methods were alive and well some years afterwards, but no statistics were available regarding the mortality in acute suppurative labyrinthitis treated by non-operative measures. He asked what method of operation Dr. Andrew preferred when the Neumann method was not practicable and whether he practised labyrinth operation in those non-suppurative cases attended by such tinnitus that the patient was driven to the verge of insanity.

Dr. Herbert Marks discussed labyrinthine suppuration and the difficulty of deciding when to open a labyrinth. It was necessary to distinguish two types: (i.) that in which the labyrinth was invaded through the oval or round windows in the course of an acute fulminating infection, (ii.) that which secondary to chronic mastoiditis followed erosion in the bone.

In the first type the meninges were quickly invaded by the path along the eighth nerve. The patient was in a desperate condition and the only hope of saving him was to perform labyrinthectomy by Neumann's method and get behind the infection before it reached the meninges. He confessed that he had never succeeded in saving a patient attacked by one of these fulminating labyrinthine infections, but always felt that something must be attempted.

In the second type the invasion was not so rapid. There was more chance of a barrier of granulation tissue being set up and the same urgent necessity for opening the labyrinth did not exist. It was unnecessary to add that the operation should be "all or nothing." A radical mastoid operation should not be performed without opening the labyrinth.

Dr. Andrew in reply to Dr. Halloran said that he could see no reason for not operating on a patient whose labyrinth was dead. He did not agree that such patients exhibited no symptoms. Generally they suffered from low-grade headache and depression. They welcomed the relief operation gave them and as the post-operative mortality in this class was almost nil he saw no reason for adopting the conservative attitude.

He agreed with Dr. Marks that in the acute cases it was hopeless to wait for a defensive barrier to be formed, as very often the patient could offer no local resistance whatever.

SINUSITIS IN CHILDREN.

By W. Kent Hughes, M.B. (London),
Honorary Surgeon, Ear, Nose and Throat Department, Melbourne Hospital; Honorary Surgeon, Children's Hospital, Carlton.

The importance of sinusitis in children is slowly but surely making its way to the front.

All the writers to date deal only with purulent or muco-purulent cases and my series differ from those who have published papers on this subject, in that very few of the patients have had pus in the nose or antrum. That is to say most of my patients have had chronic sinusitis with polypoidal degeneration of the mucosa of the antrum. All the patients on my list have had their adenoids and tonsils removed some months prior to coming under my notice, excepting one and he had obviously advanced antral trouble with such serious deafness that I did not think it advisable to wait to see the result of removal of adenoids and tonsils before operating on the antrum.

In 1895 Wolf published the results in a series of *post mortem* examinations of children who had died from diphtheria, measles and scarlet fever. Out of twenty-five patients with diphtheria twenty-two had pus or muco-pus with œdema of the mucosa of the antrum; five patients with measles and three with scarlet fever had muco-pus with œdematous mucosa.

In 1899 Pearce published the results of the *post mortem* examinations of thirty-nine persons dead of diphtheria. In twenty-five there were inflammatory changes in the antrum and in thirty-six the bacillus was present in the antra. This should have suggested the possibility of one cause of "carriers" and certainly explains why nasal diphtheria is apt to recur so constantly.

In 1900 Harke in thirty patients with diphtheria, measles, whooping cough, scarlet fever and chicken pox found *post mortem* that the antrum was affected in every case.

In 1914 Oppenheimer wrote a paper (*The Medical Record*, February 21, 1914) dealing with empyema of the antrum in childhood and stated definitely that the formation of polypoidal degeneration is most infrequent.

Dean in 1919 and 1921 wrote two papers on nasal sinusitis in children. His paper is the first report on the subject in which cases other than purulent was considered. He clearly showed the frequency of sinusitis and his paper was only meant to draw attention to its importance.

In 1921 he deals almost entirely with cases of multiple infectious arthritis in conjunction with purulent sinusitis.

Cleminson in 1921 and Lemere in 1922 carried the subject still further and Cleminson's paper in *The Journal of Laryngology* is the best exposition of the subject to date that I can find.

No author of a text book mentions the subject at all except Skillern in the 1920 edition of his book and he dismisses it in a few lines and refers to purulent sinusitis only. He writes:

> No symptoms are occasioned by the presence of mucoid cysts as most examples were found at the autopsy and were never suspected during life.
>
> Any form of purulent maxillary sinusitis in the very young (six months to twelve years) which shows a tendency to become chronic, should cause surgical intervention.

That is the sum total of text books in English on sinusitis in children except a statement by St. Clair Thomson that it is very rare.

Dean, Cleminson and Lemere all emphasize the importance of bacteriological findings from antral "wash-outs" and the close association of sinusitis of the nasal mucosa.

Many years ago my attention was drawn to the importance of sinusitis in patients with cleft palate. I have often seen patients in whom the surgeon has failed several times to secure apposition in the presence of an antral sinusitis, generally purulent. In my clinic at the Melbourne Hospital I have now a patient who has undergone eight unsuccessful operations for repair of the palate. She has a fœtid sinusitis which probably was the cause of the repeated failures. We cannot impress too strongly upon those who undertake cleft palate operations, the necessity for seeing that all parts of the nose and naso-pharynx are absolutely healthy before beginning to operate on the palate. I have frequently noted the presence of a purulent and muco-purulent sinusitis in patients with cleft palate and the adenoids are not only very large but very frequently septic.

Up to 1916 these patients with cleft palate represented my interest in nasal sinuses in children. Like the rest of the world I considered that the sinuses were too small to worry about. Since that time, however, I have been more and more impressed with their importance from a general health point of view and to-day I am somewhat anxious lest enthusiasm should carry me too far.

The series I have brought forward with a few exceptions have been treated during the past eighteen months. There are twenty-seven and they have all been sent from the clinics of my colleagues on the out-patient staff of the Children's Hospital. All these patients with one exception had their adenoids and tonsils removed before they came under my care. If I had included my earlier cases in 1916, 1918, 1919 and 1920 I could have shown a much larger proportion of cures, for the nasal mucosa in children takes quite a long time to settle down in these cases, two years at least. My earlier cases, however, were nearly all complicated with enlarged adenoids and tonsils and many of them were not treated in conjunction with any of my colleagues. You will see that out of twenty-seven patients twelve can be claimed as cured, ten as improved and in five no benefit has resulted. In the majority of the ten improved the more pressing symptoms have disappeared and in one sense they are almost cured and from my previous experience they will soon be transferred to the "cured" side of the ledger. Of the five patients not improved four have had treatment only on one side and therefore cannot be classed as failures and one who has improved a little, has developed a sphenoidal sinusitis. Symptoms are usually general in character and may not strike the average physician or pædiatrist as being "nose and throat" cases at all. The nasal specialist will not be consulted for the constantly recurring cold, the persistent cough or the headache unless the child is referred to him by the physician. It, therefore, requires the close cooperation of both, a cooperation

Patient	Age years	Date	Complaint	Radiological examination	Operation	State of Mucosa	Result of Treatment	Date	Remarks
				Increased density on left side	Washing out of both sinuses		Still discharging		
F. M.	6 4/12	May, 1921 Nov., 1921 Mar., 1922 Sept., 1922	Chronic colds, Nasal discharge			Right more diseased than left	Both sphenoidal sinuses cloudy and large		Tonsillectomy and removal of adenoids in 1920, with improvement
M. H.	9	July, 1921	Nasal discharge, obstruction, cough, muco-pus in posterior pharynx	Diagnosis confirmed	Radical (right and left)		No cough, no headache, no expectoration		Tonsils and adenoids removed in May, improved
T. K.	14	Oct., 1922	Frontal headache, increasing deafness		Double radical	Slightly thickened	Headaches better, hearing good		Tonsils removed in October, with improvement
R. J.	6	Aug. 23, 1921	Cough, headache, nasal discharge	Right antrum dull	Right radical	Mucosa greatly polypoidal	Discharge less frequent, headaches better, still has cough		
E. M.	14	July 9, 1920	Frequent coughs and colds, nasal discharge, frontal headache for eight months	Both antra dull	Double radical	Pus in both, mucosa thickened	Cough and colds better, still has headache, discharge		Septum deviated
G. P.	8	Mar., 1921	Pallor, lassitude for two years, nasal discharge, headaches	Right antrum dull	Right radical	Polypoidal	Headache better, still nasal discharge		
J. O'B.	10	June, 1921 Feb., 1923	Hoarseness, nasal discharge, headache, nocturnal delirium		Left radical Double radical	Slightly thickened	No discharge, no delirium, no headache	Sept., 1923	Condition followed typhoid
C. P.	6	Mar., 1922	Nasal discharge, headache for one year		Right radical	Polypoidal	No improvement		
D. McF.	9	Oct., 1923	Cough for four years		Left radical	Pus, polypoidal mucosa	Cough better, no discharge	Dec., 1923	
M. T.	10	Aug., 1923	Cough, nasal discharge for two years		Double radical	Polypoidal	Cough and discharge better		
E. B.	7	Dec., 1922	Nasal discharge from ear	Increased density on right side	Double radical	Polypoidal	No more discharge		Further treatment refused
A. F.	14	Nov., 1921	Nasal discharge for one year		Right radical.	—	No improvement		
A. C.	7	Mar., 1923	Frontal headaches, catarrh		Right radical	Polypoidal	Cough and headaches gone	Nov., 1923	
S. G.	12 2/12	May, 1922	Nasal discharge for eight years, haemorrhagic for eighteen months	Right antrum dull	Right radical	Thickened	Not improved		
S. R.	8	July 16, 1923	Nasal discharge		Left radical Right radical		Improved in interval		
A. de Y.	10	Oct., 1923 Sept. 18, 1923	Occasional deafness, nasal discharge, headache, snoring		Left radical	Greyish	Slight discharge, occasional headache	Nov., 1923	
E. M.	14	June, 1922	Asthma for seven years, nasal discharge	Right antrum dull	Double radical	Polypoidal	Less discharge, still has asthma	Nov., 1923	Specimen mounted
K. McS.	9	May, 1922	Muco-purulent discharge for five years		Right radical	Polypoidal	Discharge continued		
A. W.	6½	July, 1922 July, 1922	Chronic colds, morning headaches, earache, deafness		Left radical Right radical	Polypoidal	Very well, no colds, no headaches		
H. F.	10	Feb., 1923	Frontal headache for three years		Right radical	Thickened, polypoidal	No return of headache		
B. W.	9	Mar., 1923	Nasal discharge, asthma		Left radical	Pus and hypertropied			Discharging ear for three years
J. J.	6 1/12	Dec. 1, 1921 Dec. 8., 1921 Mar. 2, 1922	Headaches, nasal discharge		Left radical	Polypoidal			
K. S.	11 2/12	July, 1922	Asthmatic attacks, nocturnal cough	Shadow in left antrum	Right radical Left radical	Hypertropied, polypoidal Thickened and grey	Headaches improved No asthma since March, slight cough	Sept., 1923	
J. C.	1 5/12	Feb., 1923 Aug., 1922	Earache, sore throat for five years		Right radical Left radical	Polypoidal	Earache and sore throat better, slight nasal discharge	Sept., 1923	Tonsils removed four years before Tonsils removed in 1921. Right sinus operation not yet done
W. R.	7	Aug., 1922	Blood-stained nasal discharge for three years	Both antra dull	Left radical	Polypoidal	No improvement		
J. W.	4	Oct., 1922	Nasal discharge		Right radical Left radical	Grey	General health better, still slight discharge	Sept., 1923	
E. P.	10	May, 1923 Feb., 1923	Nose bleeding for years		Right radical	Pus, polypoidal	No bleeding, discharge continued	Sept., 1923	
C. S.	11	April, 1923	Deafness, nasal discharge, cough		Left radical	Thickened	Slight cough, no deafness, no discharge	Sept., 1923	Refuses operation on right side
W. H.	8 7/12	April, 1923	Nasal discharge for six months, headache	Right antrum dull	Left radical	Thickened	Headache and discharge better	Sept., 1923	

that throughout all our professional work is urgently needed and yet to-day seems as far off as ever and is perhaps more distant than when I was a student.

As the number of specialists grows, so are we tending to work more and more in close compartments. Oculists, for instance, still correct minute errors of refraction for headache without ascertaining whether the headache may not be caused by nasal insufficiency. An efficient air way will often obviate the wearing of glasses and at the same time provide a more effective cure of the headache.

The symptoms you will often observe are those ascribed to enlarged adenoids and tonsils; in fact it is a question yet to be solved which of them are due to the adenoids and tonsils and which to the accompanying sinusitis. Running at the nose, recurring colds in head and bronchitis, stuffiness of the nose, distressing cough, headache, *otitis media*, asthma and epistaxis are the most common symptoms associated with sinusitis. Pus and mucus do not often occur in my series.

Extreme nervousness and anæmia, as noted by Cleminson and Lemere, have not occurred often enough in my series to warrant especial notice. Most tiny children object to a forehead mirror, quite apart from the introduction of a nasal speculum.

Intractable forms of indigestion must always be kept in view, though they do not occur very frequently. Enlarged glands, submaxillary and supra-cervical, are considered of importance by Cleminson and Lemere. As all my patients had enlarged tonsils and adenoids, I have not included them in my list as evidence of sinusitis, though many of the patients still have these glands enlarged.

When we consider that the mucosa of the sinuses is continuous with that of the nose itself, it is only to be expected that inflammation and congestion of the latter will be accompanied by that of the former as a matter of course in the very large majority of patients.

As the maxillary sinus is the only one of any size in very young children, I have dealt with that sinus only to-day, although the sphenoidal sinus and the ethmoid cells may not seldom require particular attention, as was pointed out by Dean in 1919. The maxillary sinus, in that it is more inefficiently drained than the others, is more likely to suffer from permanent damage from a transitory inflammation such as occurs in an attack of specific fever *et cetera*.

Treatment.

It is essential that we first endeavour to remove all causes of congestion of the nasal mucosa in the hope that the sinus will be restored to normal without further ado. With the perfect removal of enlarged adenoids and tonsils the very large majority of patients will recover, but we must not wait too long especially in some conditions. Slight deviation of the septum can well be left alone and slight enlargement of the posterior ends of the turbinate bones can wait until other measures have been tried. Now that I am convinced of the fact that sinusitis is one of the chief causes of enlarged turbinates, I seldom remove the posterior ends, whereas formerly I did it almost as a routine, for I was so often disappointed at the temporary improvement from removal of tonsils and adenoids.

Local indications of sinusitis are often surprisingly few. A wet nose or a few strings of muco-pus may be all that there is to suggest that the symptoms are caused by a sinusitis. Stuffiness of the nose especially when increased by recumbent position is a very valuable indication. Local tenderness of bone either antral or supra-orbital is not common in my experience. Transillumination I have never used in children and long ago gave up in adults.

X-ray findings are of value, especially when the two sides vary in density, but if the symptoms warrant antral investigation a clear picture will not prevent me proceeding further, any more than the absence of a Wassermann reaction shakes my belief in a case typically syphilitic from a clinical point of view.

Treatment may be described under four heads: (i.) more or less expectant, such as alkaline douches, (ii.) irrigation; all the writers referred to look upon irrigation of the sinus as their sheet anchor. I only use it in acute purulent cases and do not repeat it in children. I note one author irrigated a sinus fifty-nine times; (iii.) intra-nasal drainage where (i.) and (ii.) have failed; (iv.) radical operation.

Expectant Treatment.

How long are we to wait for the symptoms to clear up before investigation of the sinuses? This is a very hard question to answer and I think we must judge each case on its merits. Patients with ear trouble certainly should not be allowed to wait long, either when the suppurative or non-suppurative type is present and in these I would proceed almost at once to radical measures if improvement is not shown soon after removal of tonsils and adenoids. In these cases delay may mean disaster. Where we are dealing with recurring colds and minor ailments we can afford to wait especially if weather conditions are such as to hinder recovery and they often are in our changeable Melbourne weather. The nasal mucosa in children takes quite a long time to settle down, doubtless because it is so easily congested by slight forms of irritation. I do not often use alkaline douches or menthol sprays in children as advocated by Cleminson and I wonder if they should be given a more extensive trial. Cleminson speaks very highly of a spray consisting of 0.3 gramme (five grains) of menthol, 0.12 gramme (two grains) of camphor, 0.12 cubic centimetres (two minims) of oil of cinnamon and thirty cubic centimetres (one fluid ounce) of "Albolene."

Irrigation.

All the authors above referred to employ irrigation, but I cannot myself see the use of it in any but acute cases. If you read Cleminson's paper carefully, you will note that he talks of recurring attacks after so-called cure and he only claims 25% cures, even including the patients whose condition clears up after removal of the tonsils and adenoids. In fact his whole paper to my mind is a plea not to use irrigation and as a general anæsthetic is needed in the majority of cases, why not proceed at once to more radical measures?

In persistent cases that are not relieved by irrigation, he advises intra-nasal drainage through the naso-antral wall with removal of the anterior end of the inferior turbinate. At this I demur. An effective intra-nasal opening is not an easy operation in a child. It is apt to heal rapidly

and it is ineffective for viewing the antral cavity properly. It is in my opinion just as severe a procedure as a Caldwell-Luc operation and is certainly more difficult to do properly; finally in most cases it entails a loss of a large part of the anterior end of the inferior turbinate which is much to be deplored even though it is only the lower portion of it. The objection to a Caldwell-Luc operation are not well founded. I have never known any trouble to occur to the teeth after the operation, excepting once in an adult twenty-eight years ago, and that might easily have arisen from some other cause. The bone quickly reforms in children and also in adults as I have discovered in eight patients on whom second operations had been performed, two of my own and six of other surgeons. There is very little pain and swelling if you are careful to make a small central opening and be content to work under some difficulty with bent instruments.

I endeavour to make a central crack in the middle of the antral wall and to depress the bone carrying the mucosa with it. If this can be done, it saves much time in stripping up the mucosa and makes you more certain of the thoroughness of the job. In making an opening through the naso-antral wall I do not go as far forward as I used to do and am very careful to carry my opening well back.

All my patients show mucoid degeneration, sometimes of a large gross type with large polypi. At other times there is a general thickening of the mucosa with polypoid projections scattered all over it. Would these patients get well with simple drainage and would the mucus membrane so altered even become normal? If you glance at the table you will find a very good percentage of cures. Some have not had time to show the full benefit of the operation, for you do not get the immediate results in children that you do in adults.

Is washing out the antrum after operation necessary or like packing the nose for days after a sub-mucous resection, do we just do it because others do it? I am inclined to think that cases clear up quicker without irrigation and only use it now where the discharge is foul after operation.

Dr. H. J. Gray asked for expressions of opinion regarding the efficiency of the nasal opening frequently made for the relief of antral disease in children. It seemed to him to be an inadequate procedure as in so many of the patients polypoid degeneration of the mucosa was present. It was a remarkable fact that in these instances of greatly thickened mucosa the ciliated epithelium remained intact.

Dr. R. H. Pulleine said that in all cases of persistent bronchitis in children the maxillary antra should be investigated. He utilized trans-illumination in these young patients, but it was not possible to do more than detect differences between the two sides by this method of examination. He did not remove the antral mucosa even when it was polypoid and had arrived at the conclusion that cure came about more quickly if the mucous membrane were left.

Dr. F. Andrew said that he frequently met antral suppuration in children. He had found that in many children the condition responded very well to a single lavage. In operating for tonsils and adenoids he often took the opportunity to make an exploratory opening and sometimes found pus in the antrum. Children not infrequently manifested pan-sinusitis and there seemed to be special liability to involvement of the ethmoid. How were they to deal with the ethmoid? He thought that whenever possible operation on the ethmoid should be deferred until the patient had passed the age of childhood. He dealt with the antral mucous membrane either by removing it in toto or by leaving it entirely alone.

Dr. W. N. Robertson expressed the opinion that antral disease in children was less common in Queensland than appeared to be the case in the other States. Infected tonsils, naso-pharyngeal adenoids and the exanthemata were the precursors of sinusitis in children. He believed in the efficacy of the radical operation as against the intra-nasal operation. Many children developed bronchiectasis if the antra were neglected.

Dr. S. A. Ewing mentioned that the occurrence of suppurative osteitis was a risk attendant on total removal of the antral mucous membrane.

Discussion was carried on by Dr. G. A. D. McArthur, Dr. B. Shorney, Dr. C. Halloran and Dr. T. S. Kirkland.

Mr. Kent Hughes in reply said that he had intended his remarks to be applicable to chronic antral disease only. With reference to the relative utility of X-ray examination and transillumination he observed that the latter was frequently fallacious in its indications and that the former was not absolutely reliable. If any part of the antral mucous membrane was polypoid, the whole lining was diseased and he did not think that polypoid mucosa ever regenerated or became healthy.

RADICAL FRONTAL SINUS OPERATION THROUGH THE ORBITO-FRONTAL WALL WITH AFTER TREATMENT BY THE OPEN METHOD.

By R. S. Godsall, M.B., Ch.M., F.R.C.S.,
Sydney.

In this short paper on the frontal sinus operation I do not propose to do more than describe the procedure by which the sinus is opened and treated by removal of the inferior or orbito-sinus wall.

Apparently this method of approach was first described by Jansen and Knapp in 1908, R. C. Lynch of America in 1921 and more recently by Howarth of London.

My reason for bringing it up again is because I have consistently practised this method since 1913 with uniform success.

The advantages claimed are: (i.) That there is no deformity, the cosmetic results are excellent; (ii.) the whole sinus can be thoroughly inspected and treated and the healing observed and corrected, (iii.) the risk of osteomyelitis is negligible, (iv.) the region of the cribriform plate is easily identified and can be guarded against injury, (v.) that it is in accord with sound surgical principles in dealing with a septic bone cavity, (vi.) that complete relief of symptoms is afforded.

The main objections can be stated as follows: (i) The dressings are painful for the first few days, (ii.) the length of treatment, (iii.) secondary suture of the wound is needed.

In the earlier cases the wound was closed at the time of operation, but for the past few years I have treated all the cases by the open method.

I had occasion in two successive cases to reopen the wound in which profuse pus formation had taken place with grave constitutional symptoms. The sinus was packed and rapid improvement followed. This induced me to follow the open method in future cases.

Radiograms will give us a very good indication of the size of the cavity.

In all cases intratracheal anaesthesia is used, the post-nasal space is not plugged as the mechanical sucker is relied on to keep the field free of blood and to evacuate pus from the sinus, thus helping to protect the orbital tissues from infection. A preliminary packing of the nose with cocaine and adrenalin will help to make the later stages of the operation practically bloodless.

The skin incision is similar to the Killian. The eyebrow not being shaved. On reaching the periosteum on the lower margin of the supra-ciliary ridge the knife is carried on down to the bone for the whole length of the skin incision except in the region of the pulley of the superior oblique which is temporarily left *in situ*. The periosteum is now carefully stripped down from the floor of the sinus or orbito-sinus wall to its full extent from the lower edge of the nasal process of frontal bone, the *lamina papyracea*, the lachrymal bone and the nasal process of the superior maxilla, care being taken not to buttonhole the orbital periosteum.

During the elevation of the periosteum from the lachrymal bone the lachrymal sac is carefully dislodged from its groove. The floor of the sinus can now be safely entered just above the lachrymal bone and mesial to the trochlear pulley; the sinus is explored with a probe; its dimensions are noted and the condition of the lining membrane is inspected.

The floor of the sinus is next removed by following it back to the angle formed with the posterior or brain wall, then working outwards. The pulley is now detached if extension of the sinus renders it necessary.

Every portion of the floor must be removed to make sure that no polypoid mucous membrane remains. The mucous membrane of the sinus is removed with a blunt spoon and repeated wiping with small gauze swabs.

Attention is now directed to the inner part of the wound and a probe is passed down the fronto-nasal duct into the nose. This probe should be very malleable, as it is left in the duct and bent back over the forehead. The probe acts as guide to and protects the cribriform plate, the area in front and to the outer side of the probe being a safe working space. The eye is retracted and protected by means of a Killian spatula.

The orbito-nasal wall in front of the probe is now removed.

The chisel is held vertically and directed downwards and away from the cribriform plate. The nose is entered by breaking through the lachrymal bone working forward to the anterior bony ridge of the lachrymal groove not encroaching any further forward than is necessary to obtain access to the anterior ethmoidal cells.

If too much of the nasal process of the superior maxilla is removed, the tissues tend to fall in and block the fronto-nasal region when healing and cicatrization occur, making it impossible to examine and treat this region from the nose.

We thus open up the fronto-nasal duct and expose the whole ethmoidal region.

After careful exenteration of the ethmoidal cells and curetting any fronto-ethmoidal cells or orbital galleries of cells, the sphenoid will come into view and can be dealt with if necessary.

I do not think it out of place here to remark that any disease of the antrum should have been previously treated and if necessary a radical antral operation performed, as the complete cure cannot be expected unless the lower part of the nose is clean and healthy.

As a matter of fact failure to treat the antrum previously and incomplete removal of diseased tissue in ethmoid and sphenoidal regions is responsible for practically all the failures and complications.

It is noted in some descriptions that the mucous membrane is left intact. In all my patients the membrane was so grossly diseased that I could not imagine it ever becoming normal. In fact, if the radical operation is justified, it is only because the membrane is hopelessly diseased or in the case of some anatomical abnormality which rendered an intra-nasal operation impossible.

The frontal sinus is now flushed out with warm "Eusol" solution and then the cavity inspected and any remaining mucous membrane removed.

The cavity is now packed with twelve millimetre gauze soaked in "Eusol"; the ethmoid region is also packed.

The external wound is not sutured. The packing is removed in twenty-four hours, the cavity syringed with "Eusol" and again packed. A little 10% solution of cocaine applied to the nasal mucous membrane and the edges of the wound render the dressing as painless as possible.

Iodoform or saline solution may later be substituted for "Eusol," which, however, is very efficient in cleaning up the cavity.

The after treatment must be done by the surgeon himself or someone conversant with the procedure.

It is absolutely necessary to pack all recesses of the cavity firmly; unless this is done pockets will form with bad results.

The average treatment is from three to six weeks according to the size of the sinus.

The cavity rapidly reduces in size and when filled with firm healthy granulations, a secondary suture is performed.

It will be found necessary to free the skin and subcutaneous tissues of the eyebrow and nose and also the skin of the upper lid making sure that the parts come together without tension. The sutures are removed about the fifth day.

I have personally performed this operation on forty-one patients and can claim a complete cure of the frontal condition and uniform relief from the headaches and the discomfort which so usually follows the other method.

The object of this paper has been to elicit discussion on the radical frontal sinus operation and persuade you to try this method.

I have not entered into description of the other methods which are so well known to you all.

The method is not put forward as a new operation, although it was worked out without knowledge of any previous operation by this route.